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## **CONTAMINATION ASSESSMENT REPORT**

*for the*

**CHEVRON CHEMICAL COMPANY SITE  
ORLANDO, FLORIDA**

*(USEPA Docket No. 90-37-C)*

*December 1990*

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# CHAPTER 1.0

## *INTRODUCTION*

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This report presents the results, conclusions, and recommendations of the contamination assessment of the Chevron Chemical Company site in Orlando, Florida. The assessment was performed in accordance with the Site Cleanup Workplan (July 1990) which was prepared in accordance with the Administrative Order on Consent with Chevron Chemical Company and Mr. Robert R. Uttal (EPA Docket No. 90-37-C). Mr. Uttal is the current owner of the site, and Chevron Chemical Company is the former site owner.

The assessment involved the collection and analysis of soil and groundwater samples from the site. In addition, a sediment sample was collected from an offsite stormwater retention pond that receives drainage from the site.

### 1.1 SITE LOCATION AND DESCRIPTION

The Chevron Chemical Company site (site) is located in the 3100 block of North Orange Blossom Trail (Highway 441) in Orlando, Florida (Figures 1-1 and 1-2). The site is bordered to the east by Orange Blossom Trail, which serves as the main access to the site, to the west by industrial facilities, to the south by railroad tracks, and to the north by a mobile home park. Lake Fairview is located approximately 1,000 feet northeast of the property. The total area of the site is 4.39 acres (EPA, 1990).

See  
Figures  
1-1 and  
1-2

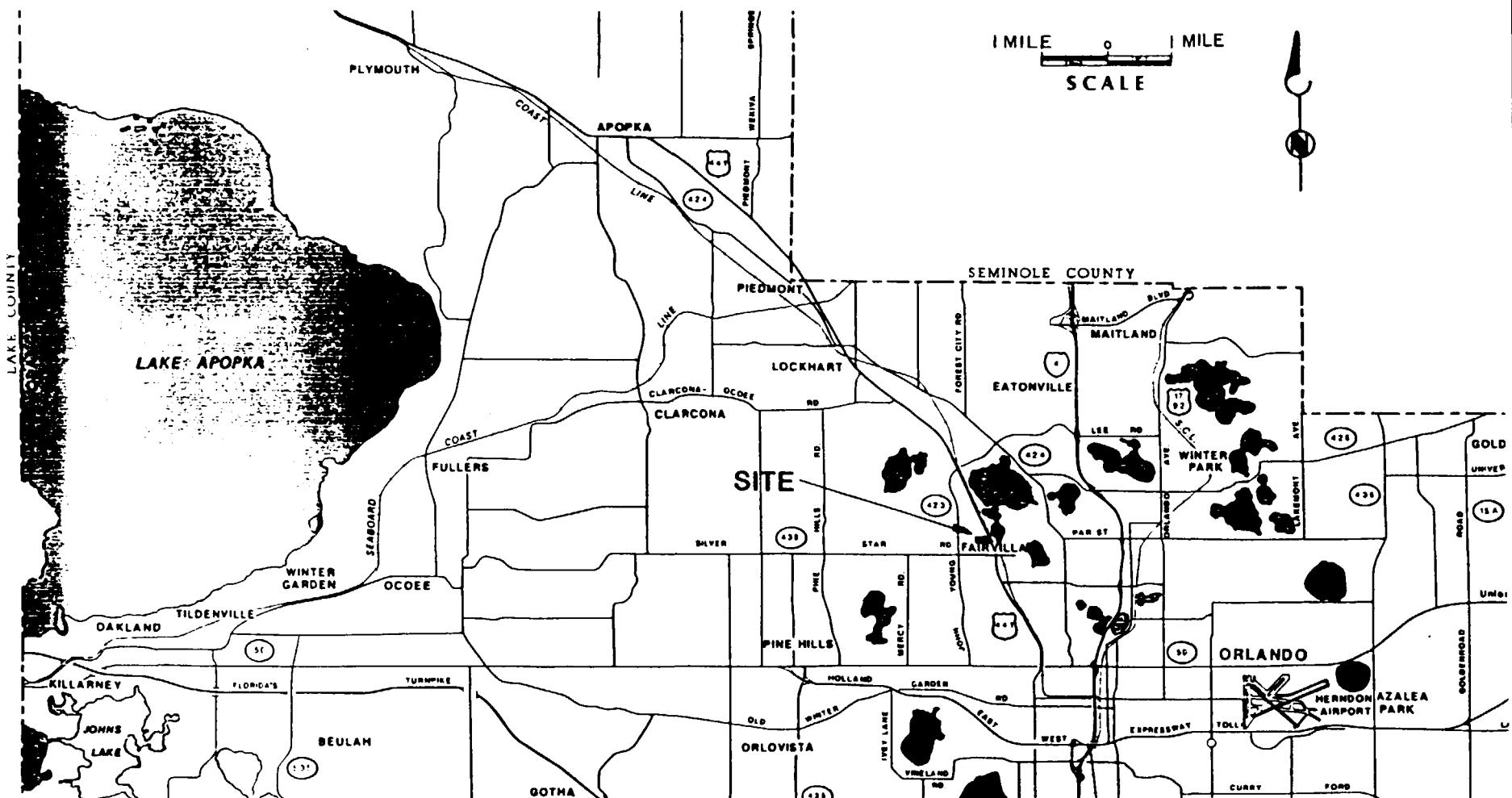
The majority of the site is paved. There is an office building on the east side of the site and a warehouse along the southern boundary. A rail spur runs within the south property line. A large, inactive elevated water tower is located towards the west end of the property.

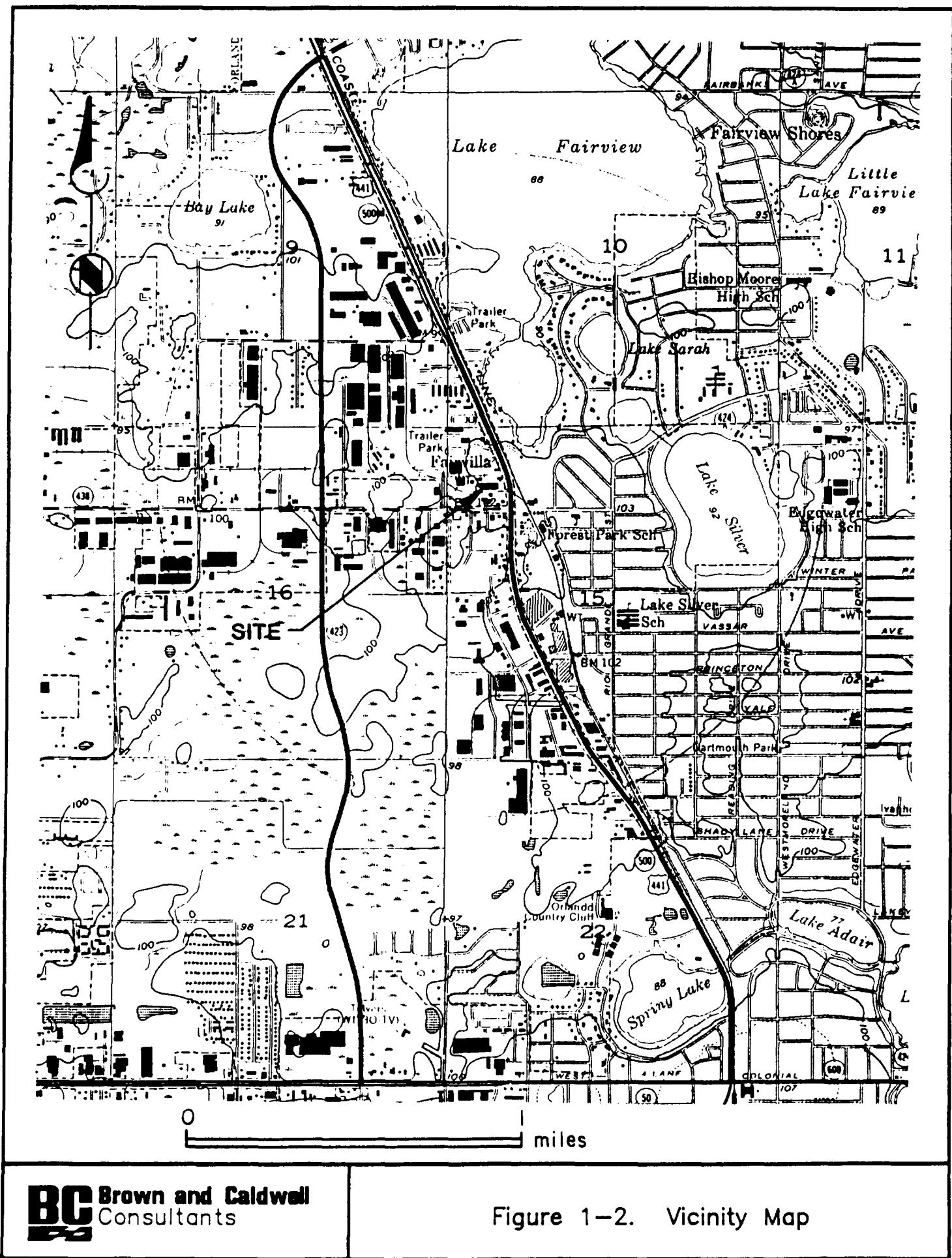
### 1.2 SITE HISTORY

Between the years 1950 to 1976, Chevron Chemical Company utilized the site for the formulation of pesticides and crop sprays. Prior to Chevron's use, the site was undeveloped and forested with cypress trees (Dames & Moore, 1983, and Patry, 1987).

The facility formulated a variety of liquid and powdered pesticides, citric sprays, and "nutritional" sprays. The majority of the active pesticide ingredients were delivered in drums by trailer trucks. Bulk liquids, usually carrier solvents, were delivered by tanker trucks and very occasionally by tank railroad car. Finished packaged goods were shipped by truck. No rail shipment of finished goods occurred due to the local nature of the business.

Chemicals used in pesticide formulation included xylene, kerosene, mineral oil, and aromatic naphtha. Pesticides formulated in large volumes consisted of parathion, chlordane,





**CHAPTER 1. INTRODUCTION**

phaltan, captan, malathion, and paraquat. Pesticides formulated in smaller volumes consisted of DDT, difolatan, BHC-lindane, dieldrin, aldrin, dibromamine, and "nutritional" sprays (aqueous solutions of copper, zinc, manganese, sulfur, and boron) (Patry, 1987).

The main features of the former pesticide formulating facility, as illustrated in Figure 1-3, consisted of seven above ground bulk liquid storage tanks, a barrel storage area, a barrel rinse area, two pesticide rinsate ponds, three septic tank drain fields, an underground storage tank, a large building which housed the dry and liquid pesticide formulating and warehousing operations, and an office building.

See  
Figure  
1-3

The underground storage tank was used to store diesel fuel which was used primarily to refuel forklifts.

The rinsate ponds were unlined and used for the collection and disposal of pesticide formulating rinse water, barrel rinse water, floor washdown water, and storm water by evaporation and percolation. Prior to 1970, any rinsate that was not collected and reused for subsequent pesticide formulations was discharged to the two rinsate ponds, which were connected in series. After 1970, the pesticide formulating rinsate that was not reused in subsequent pesticide formulations was collected and disposed of offsite (Patry, 1987).

The rinsate ponds were constructed in the western portion of the site by excavation of the sandy soil found at the site. Rinsate Pond A was approximately 90 feet long by 45 feet wide, and Rinsate Pond B was approximately 70 feet long by 20 feet wide. Both ponds were approximately 3 feet deep (Dames & Moore, 1983). Following Chevron's sale of the site in 1978, the ponds were filled in with concrete, scrap metal, and soil (Starosciak, et al, 1990).

The warehouse/formulating plant floor is a continuous 4-inch cement slab. A floor drain was located in the liquid formulating area, and the drain discharged through an opening in the southern sidewall of the building onto the ground surface adjacent to the rail spur (Figure 1-4). Pipelines from the seven bulk liquid storage tanks entered the building through this opening in the building sidewall (Patry, 1987).

See  
Figure  
1-4

The area adjacent to the buildings to the north, east and west is paved and was used for temporary storage of drums and packaged goods. The remainder of the facility, including the area near the rinsate ponds, was not paved. It was reported by former Chevron plant personnel that the area designated as the barrel storage area was never used by Chevron for storage due to poor drainage in the area.

According to former Chevron plant personnel, incidental spills or leaks of pesticides and carrier solvents were promptly cleaned up. However, the following occurrences present potential sources of site contamination.

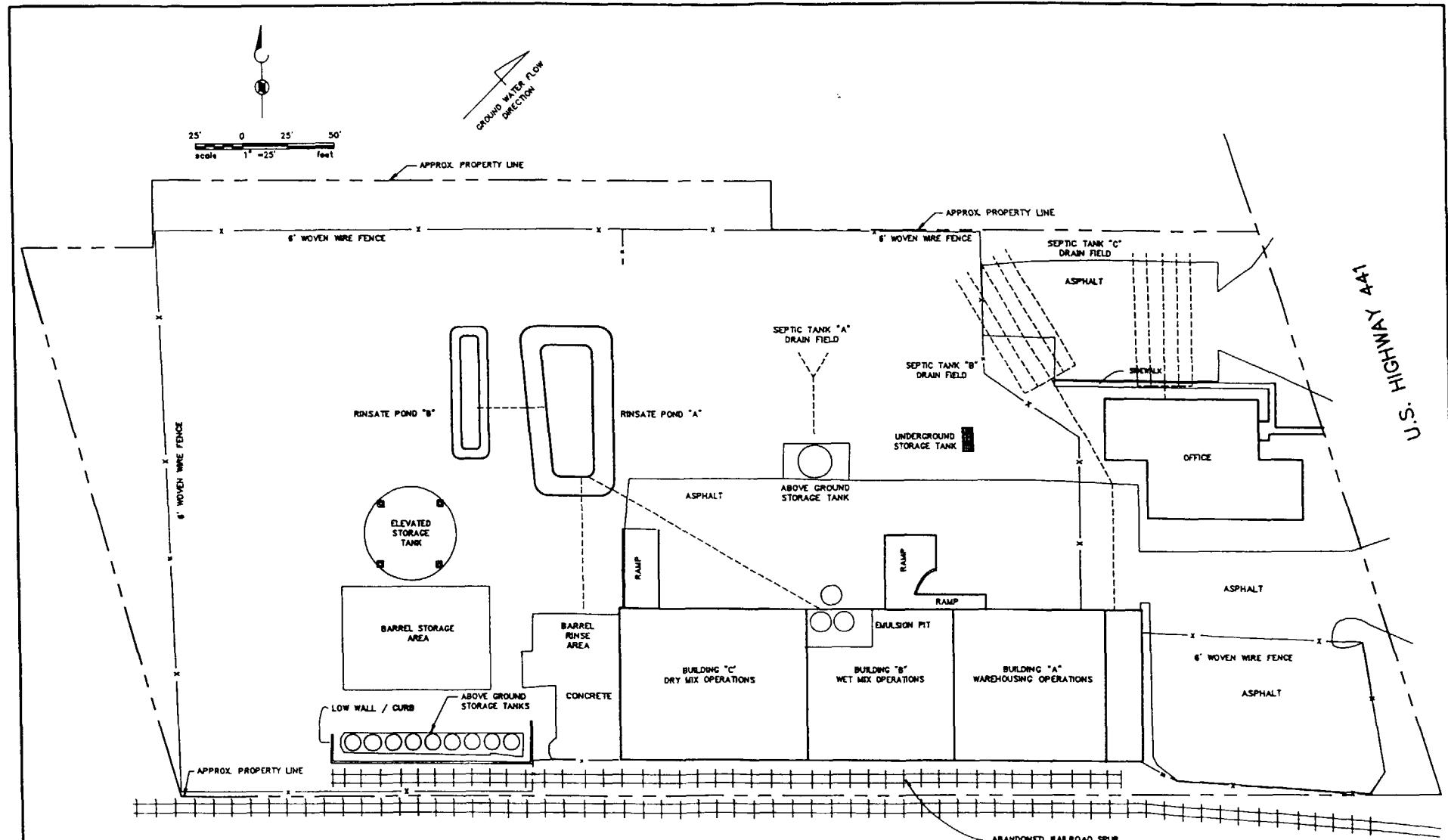


Figure 1-3. Site Layout—Chevron Operations

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- **Difolatan Burial.** In the 1960s, several tons of an off-specification batch of difolatan were generated. The gelatinous difolatan was placed in the eastern rinsate pond (Rinsate Pond A), and subsequently buried during later backfilling of the pond.
- **Parathion Leakage.** In the early 1960s several pallets of parathion (5-gallon pails) were stored behind the office building. Upon later inspection, they were found to be empty and had drained onto the ground. No cleanup actions were performed.
- **Rail Spur Area.** A spill of a chlorinated carrier solvent occurred in the liquid pesticide formulating area. The solvent entered the floor drain and discharged onto the ground surface between the sidewall of the building and the railroad tracks. The volume of the spill is unknown but was reportedly restricted to a small area between the building and the railroad tracks.

In 1976, Chevron ceased pesticide formulating operations at the site. The remaining inventories were removed from the site, although storage of small quantities of pesticides may have occurred at the site prior to sale of the site in 1978 to Mr. Robert R. Uttal. Following discontinuance of formulating activities in 1976, Chevron drained all equipment and lines, and washed down the formulating areas with water. The rinsate ponds were backfilled with soil between 1976 and 1978.

In 1978, the site was purchased with an "as is, where is" contractual condition by Mr. Uttal, who leased the site as Central Florida Mack Trucks Company, a truck sales and service facility (EPA, 1990). Prior to leasing the property, Mr. Uttal modified the site as described below.

The pesticide formulating equipment, including the dust mill and liquid formulating facilities were sold and removed from the site. Prior to removing the dust mill, all dust was drummed and moved to the barrel storage area. According to Mr. Uttal, this area was also used to store 20 to 25 drums (30- and 55-gallon capacity) that were partially filled with liquid pesticides including paraquat. The drums were ultimately removed for offsite disposal by an independent firm. The concrete sump beneath the dust mill was filled with sand, then concrete and brought up to grade (Patry, 1987, and Starosciak, et al, 1990).

Following removal of the plant equipment, Mr. Uttal washed the entire interior of the building to remove remaining pesticide dust with water followed by a soapy water rinse. The floor was then rinsed with mineral spirits. No attempt was made to collect the rinsate. After rinsing was completed, the drain lines in the buildings were filled with sand and capped with concrete (Starosciak, et al, 1990). Mr. Uttal reported that he replaced some of the metal siding on the building and discovered pesticide residue within the wall space. This material was also washed out with water and the rinsate was allowed to run onto the ground (Patry, 1987).

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**CHAPTER 1. INTRODUCTION**

After cleaning the building, Mr. Uttal poured a 50-foot by 120-foot concrete slab adjoining the north side of the building and constructed four truck service bays over the slab (Figure 1-5). The slab was poured directly over the existing asphalt pavement.

See  
Figure  
1-5

Mr. Uttal filled the underground storage tank located north of the paved area with concrete to provide a firmer surface for truck traffic. The tank may not have been completely filled with concrete (Patry, 1987, and Starosciak, et al, 1990).

Mr. Uttal reported that the rinsate pond area would not support the weight of trucks, and he established an agreement with Rinker Concrete to pour waste loads of concrete over the area to stabilize it. He reported that scrap metal was also disposed of in the rinsate ponds (Starosciak, et al, 1990). In addition, Rinker poured waste loads of concrete across the northwest area of the site.

As Central Florida Mack Trucks Service Center, Mr. Uttal's operations included truck servicing and truck parts sales. All servicing operations including general truck repairs were conducted inside of the four service bays. Minor maintenance was performed in the yard (Starosciak, et al, 1990). A visual inspection of the outside operations area suggested that maintenance operations were performed in this area.

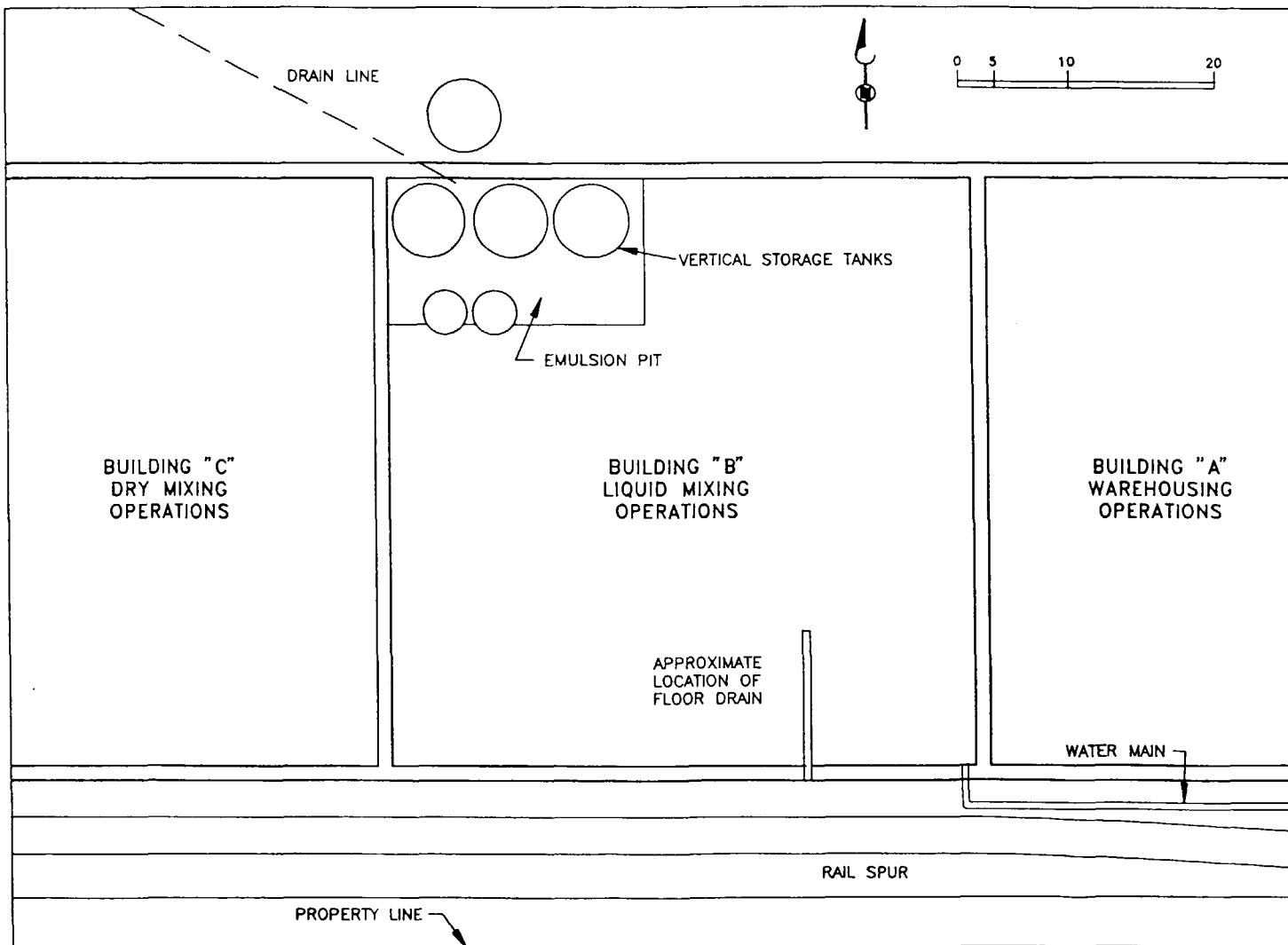
Truck servicing operations were conducted from 1978 to 1986. These operations consisted of overhauling engines, starters, generators and front/rear ends. A vertical degreaser was used to clean engine parts. The degreasing operations produced about three 55-gallon drums of spent degreasing agent per year; when the agent was spent, it was transferred to a 55-gallon drum which was collected by a contracted hauler (Starosciak, et al, 1990). No information is available concerning the type of degreasing agent that was used.

A 500-gallon skid mounted tank of kerosene was stored inside the service bays. Two skid mounted tanks located in the outside operations area were used to store virgin oil. Waste oil was stored in an above ground cylindrical storage tank located to the west of the buildings in one of the seven original storage tanks used previously by Chevron. The waste oil was periodically picked up by an oil recycling firm.

Mr. Uttal operated a paint shop in the western truck servicing bay. The painting operation consisted of mixing Dupont Ameron (polyurethane base) with an accelerator and spray applying the paint by air compressor. Unused paint was allowed to harden in the can and was thrown into the dumpster for offsite disposal (Starosciak, et al, 1990).

A concrete pad located at the northwest corner of the site was constructed in late 1984 for use as a helicopter landing pad. The pad has water sprayheads at each corner which were used to wet the pad area to minimize dust during helicopter operation. The pad was used as a landing site for Mr. Uttal's private helicopter (Starosciak, et al, 1990).

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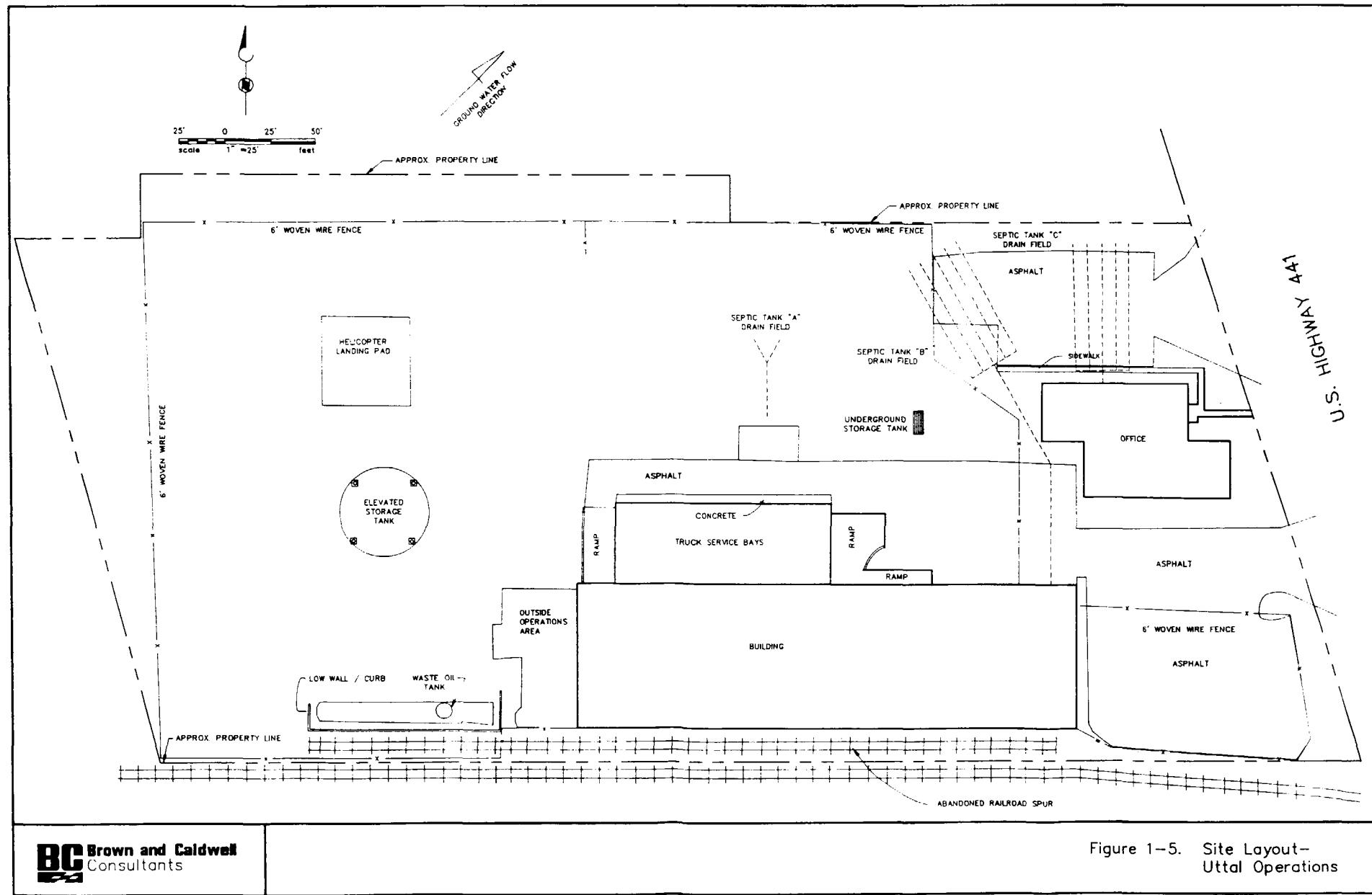


Figure 1-5. Site Layout—  
Utta Operations

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**CHAPTER 1. INTRODUCTION**

In March 1984, a tanker truck owned by Waste Management filled with 3% hydrochloric acid and an unknown amount of nitric acid, was taken to the site for repair. The tank apparently leaked in the vicinity of the former western rinsate pond, resulting in an explosion. An estimated 3,000 to 6,000 gallons of acid were released. The local fire department was called to contain the spill. Waste Management excavated the contaminated soil to a depth of 9 to 10 feet in the spill area (100 feet by 100 feet), and shipped the contaminated soil to the Chemical Waste Management secure landfill in Emelle, Alabama for disposal. The excavation was then backfilled with clean fill (Patry, 1987, and Starosciak, et al, 1990).

Mr. Uttal closed down his operations on November 2, 1986, selling all plant equipment on-site except for the two skid mounted oil tanks and the waste oil tank located at the southwest end of the site. In 1987, Mr. Uttal leased the property to Mr. Richard Keating (Starosciak, et al, 1990).

On June 2, 1987, Chevron inspected the site, and reported the following:

1. General - The facility was closed and for lease. The buildings appeared empty with all equipment and chemicals removed although a thorough inspection was not made. The grounds are generally free from debris with the following exceptions:
  - a. Southwest - several truck bodies, trailers, etc., were abandoned in this area.
  - b. Warehouse - the dynamometer located at west end of warehouse was partially disassembled with pieces of equipment lying on the ground.
  - c. Drums - perhaps 5 to 8 drums were lying in bare ground in the northern portion of the property. The condition and contents (if any) of these drums were not determined.
2. Contamination - Obvious surface soil contamination was observed in two areas: the rail spur and the southwest end of the outside operations area.
  - a. Rail Spur - obvious oil and grease contamination was present along the base of the outside operations area near the rail spur and along the length of the foundation. Free liquid oil was not observed.
  - b. Southwest of Outside Operations Area - a 50-foot by 100-foot area of oily dirt was found southwest of the outside operations area. The composition of the oily material could not be determined but a distinct petroleum odor was noted.

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**CHAPTER 1. INTRODUCTION**

Brown and Caldwell inspected the site on May 9 and June 7, 1990, and observed the following:

1. The site was abandoned, and the roof in the westernmost portion of the warehouse (Building C) had collapsed.
2. Oil staining was visible on the concrete in the outside operations area, and directly south and southwest of this area near the rail spur.
3. Various types of debris consisting of an empty car body, car batteries, pieces of truck bodies, construction debris, and empty drums were strewn over the northern and western portions of the site.
4. A faint pesticide odor was detectable between the building and the rail spur in the vicinity of the floor drain outfall.
5. Approximately 30 empty drums which previously contained sodium silicate were being stored directly on the ground surface northwest of the service bays.
6. With the exception of the rail spur area, the site was secured by a 6-foot high chain link fence topped with barbed wire.

### 1.3 PREVIOUS INVESTIGATIONS

At the request of Chevron Chemical Company, Dames & Moore conducted an investigation to determine the extent of soil and groundwater contamination at the site from the prior chemical facility operation. The investigation was conducted in the summers of 1981 and 1982. The final report was issued in January 1983. Laboratory analysis of soil samples for pesticides indicated the presence of chlordane and lindane. Laboratory analysis of groundwater samples for pesticides and metals indicated that concentrations of arsenic and lindane exceeded primary drinking water standards. Chlordane, DDD-o,p, and DDD-p,p were found in concentrations exceeding EPA guidelines found in Quality Criteria for Water, 1976. Dames & Moore concluded that the soil and groundwater contamination was mainly attributable to the past use of the pesticide rinsate ponds. It was also concluded that pesticides are not likely migrating offsite in the groundwater, but that arsenic could potentially migrate offsite in the groundwater in concentrations exceeding the primary drinking water standard (EPA, 1990).

In January 1987, Southeastern Investment Properties, Inc., considering the purchase of the site, retained Jammal & Associates to investigate the site. Analysis of groundwater samples for benzene, toluene, xylene and EPA 601 compounds (synthetic and volatile organic compounds) indicated the presence of several types of synthetic and organic compounds (benzene, xylene, trichloroethane, 1,1-dichloroethane, 1,2-dichloroethane, methylene chloride, and chlorobenzene) above State of Florida maximum contaminant levels for drinking water and groundwater guidance concentrations for assessing contamination. These compounds were

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**CHAPTER 1. INTRODUCTION**

detected in the groundwater in the vicinity of the former rinsate ponds, near the rail spur, and in the southwest corner of the site. This second investigation did not include analysis for pesticides.

In May 1989, NUS Corporation (a contractor for EPA) conducted a site screening inspection under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). NUS collected surface and subsurface soil, and groundwater samples from the site (EPA, 1990). The analytical results for the soil samples indicate the presence of pesticides, benzene, toluene, xylene, naphthalene compounds, and metals along the rail spur adjacent to the floor drain outfall. Chlordane was detected in the southwest corner of the site. In the vicinity of the former rinsate ponds, pesticides, metals, benzene, toluene, xylene, and naphthalene compounds were detected.

In the groundwater samples, metals, benzene, toluene, and xylene were detected in the rail spur area near the floor drain outfall. In the vicinity of the rinsate ponds, metals, pesticides, xylene, benzene, trichloroethylene, and chlorobenzene were detected.

#### 1.4 SCOPE OF CONTAMINATION ASSESSMENT

As described in the Site Cleanup Workplan (July 1990), the contamination assessment includes the following activities.

1. Clearing of the northern and western portions of the site to remove inert debris and dense vegetation.
2. Ground penetrating radar (GPR) survey of the site.
3. Installation of sixteen groundwater monitor wells.
4. Groundwater sampling and analysis.
5. The collection and analysis of 26 discrete and 14 composite soil samples.
6. The collection and analysis of one sediment sample from the stormwater retention pond located west of the site. This pond receives drainage from the rail spur area of the site.
7. Soil gas investigation of underground storage tank (UST) area using an organic vapor analyzer (OVA).

The contaminant assessment was performed in accordance with the Site Cleanup Workplan with the following exceptions:

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- Fourteen rather than sixteen groundwater monitor wells were installed and sampled. This was because two of the sixteen wells were to be installed adjacent to the collapsed section of the warehouse, but were not because of the safety hazard posed by the unstable warehouse wall still standing adjacent to the two planned well locations. Demolition of this wall to remove the safety hazard is in the process of being contracted by Mr. Robert Uttal, and the demolition work will likely be performed in December 1990.
- Three of the thirteen discrete soil samples to be collected from the rail spur area were not collected because the sampling location for these three samples is in the area adjacent to the unstable warehouse wall described above.
- During the soil gas investigation of the UST area, the OVA malfunctioned. As an alternate approach, two soil samples were collected (one from each end of the UST) for total petroleum hydrocarbon analysis.
- A sample of the sludge contained in the sump in the above ground storage tank area was collected for analysis.

The scope of the contamination assessment is further described in Chapter 3, and the environmental setting of the site is discussed in Chapter 2. The results of the site investigation are presented in Chapter 4 and an evaluation of the results is presented in Chapter 5. Chapter 6 presents the conclusions and recommendations.

## CHAPTER 2.0

### ***ENVIRONMENTAL SETTING***

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This chapter describes the general environmental conditions at the site and in the surrounding area, including physiographical, climatological, geological and hydrological characteristics.

#### 2.1 PHYSIOGRAPHY

W.W. White has divided Florida into three geomorphic zones (White, 1970). These zones are the northern, or proximal zone; the central, or midpeninsular zone; and the southern, or distal zone. Orange County is in the central zone (or midpeninsular highland) which is formed by subparallel fossil beach ridges formed during higher stands of sea level (Pleistocene age). The ridges roughly parallel the present coastline, as depicted by W. A. White (Figure 2-1), and are separated by broad valleys or plains. The subject site is located within the Osceola Plain, between the Orlando and Mount Dora Ridges, as shown in Figure 2-1.

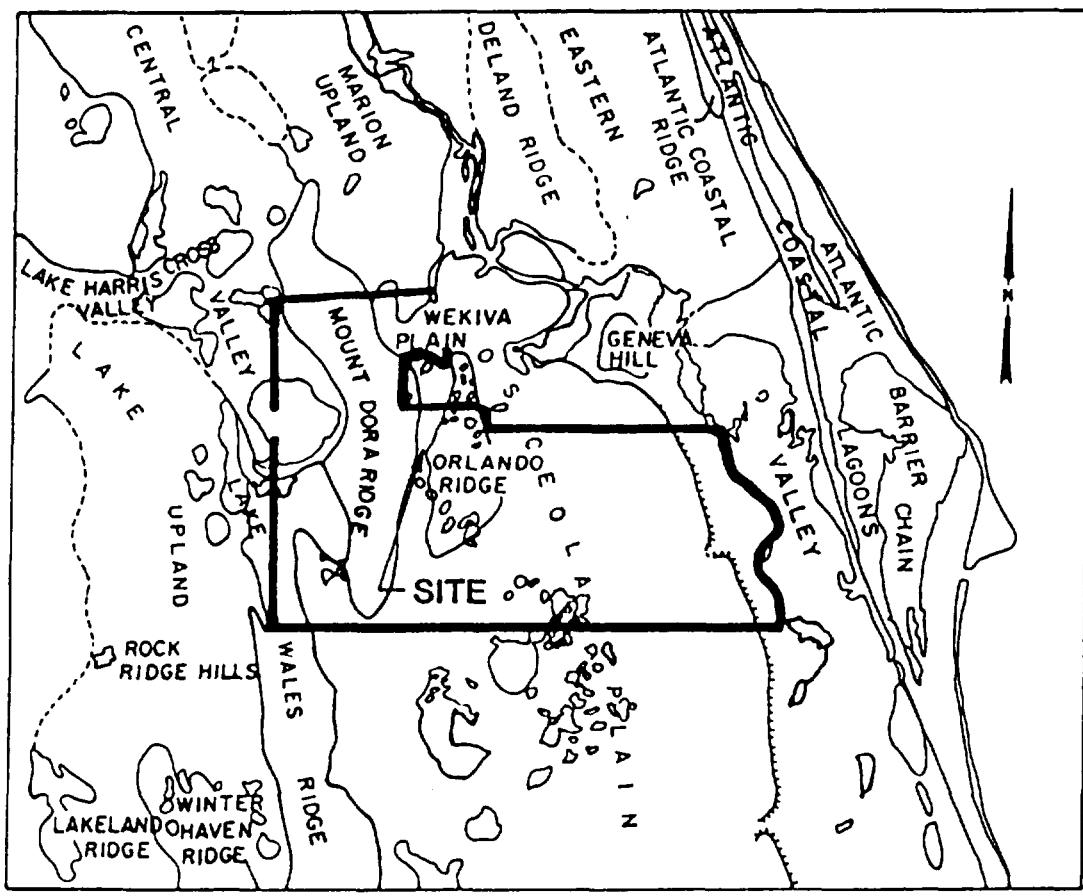
See  
Figure  
2-1

The Osceola Plain is generally nearly level. There are a few very gently sloping low ridges; but over large areas, the changes in elevation are so gradual as to be barely perceptible. The Osceola Plain has many intermittent ponds, swamps, and marshes, and a few permanent lakes. Most of the areas are connected by sluggish streams or by wide, shallow sloughs.

North and west of the Osceola Plain are the nearly level to rolling Marion Upland, Mount Dora Ridge, Orlando Ridge, and Lake Wales Ridge. Most soils in this part of county have slopes that are between 0 and 8 percent, but in some areas that are near sinkholes, the soils have slopes of nearly 25 percent.

The ridges may represent erosional remnants of the "Hawthorn Delta." The elevation of the ridge areas ranges from 50 feet to 310 feet. These ridges represent a relatively mature karst surface that has a wide range in elevation, has numerous lakes, but has only a few continuous streams. Most of the drainage water seeps into the lakes. Rock Springs and Wekiva Springs, in the northwestern part of the county, form the source of one branch of the Wekiva River, a tributary of the St. Johns River. Lake Apopka, which lies along the western boundary of the county, drains into a branch of the Ocklawaha River, which is also a tributary of the St. Johns River (Doolittle, 1989).

The topography of the subject site is relatively flat, with onsite elevations estimated to be approximately +100 feet mean sea level (MSL), as interpreted from the U.S. Geological Survey (USGS) Orlando West quadrangle map. The site is located in a well developed area



0 10 20 MILES

APPROXIMATE SCALE



**Brown and Caldwell**  
Consultants

Figure 2-1. Physiographic Map of  
Central Florida; Orange County, Florida,  
and the Surrounding Area

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**CHAPTER 2. ENVIRONMENTAL SETTING**

with buildings, cement foundations, and asphalt pavement covering approximately 60 percent of the site (Jammal & Associates, 1987).

## 2.2 LAND USE

Immediately north of the site is a residential trailer park and an automobile interior refurbishing shop. U.S. Highway 441 forms the east boundary of the site. East of this highway is commercial office space of the Orlando Commercial Center, a Union Oil Company warehouse, and Tropical Plant Products.

Southeast of the site is a McDonald's restaurant. Directly southeast is an abandoned service station. Next to the service station and directly south of the site is Hubbard Construction Company. This facility has an equipment yard, shop, and a steam cleaning operation.

An insulation company and wood products firm are located just west of the site. An underground tank is present at the insulation company (Patry, 1987).

## 2.3 CLIMATE

The climate of Orange County is subtropical. Relative humidities remain high due to the proximity to the Atlantic ocean and the area's many lakes and swamps. Thundershowers are frequent during the summer afternoons. Winters are short and mild; many of the days are bright and sunny, and there is little precipitation. Cold spells accompanied by cold winds can be expected only a few times during the year and last only a few days. Generally the cold spells are preceded by rain.

Average temperature and rainfall data, based on records from 1951 to 1980 for Orange County are summarized in Table 2-1. This information was compiled from records at the Weather Service Office, Orlando Jetport at McCoy International Airport.

See  
Table  
2-1

The average annual temperature is 71.8 degrees Fahrenheit ( $^{\circ}$ F). In winter the average temperature is 61.1  $^{\circ}$ F, and in summer it is 81.1  $^{\circ}$ F. The temperature rarely exceeds 95  $^{\circ}$ F. Frosts have occurred as late as March 23rd and as early as November 10th. The average frost-free season lasts for 314 days, or from February 3rd to December 14th. The most recent lowest temperature recorded in Orlando was 20  $^{\circ}$ F on December 26, 1983, but a reading of 19  $^{\circ}$ F was recorded in Zellwood to the north of Orlando in February, 1947. Generally, the temperature drops to below freezing for only a few hours before dawn.

Rainfall is fairly abundant. The rainy season extends from June through September. About 57 percent of the precipitation falls during this period. During the rest of the year, the rainfall is distributed fairly uniformly. Most of the precipitation occurs in summer. During this

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TABLE 2-1. Temperature and Precipitation

Month	Temperature			Precipitation	
	Normal daily mean <u>°F</u>	Normal daily maximum <u>°F</u>	Normal <u>°F</u>	Normal total 1951-1980 <u>In</u>	Prevailing direction of winds
January	60.5	71.7	49.3	2.10	NNE
February	61.5	72.9	50.0	2.83	S
March	66.8	78.3	55.3	3.20	S
April	72.0	83.6	60.3	2.19	SE
May	77.3	88.3	66.2	3.96	SE
June	80.9	90.6	71.2	7.39	SW
July	82.4	91.7	73.0	7.78	S
August	82.5	91.6	73.4	6.32	S
September	81.1	89.7	72.5	5.62	ENE
October	74.9	84.4	65.4	2.82	N
November	67.5	78.2	56.8	1.78	N
December	62.0	73.1	50.9	1.83	NNE
Average/ Total	72.4	82.8	62.0	47.83	S

---

**CHAPTER 2. ENVIRONMENTAL SETTING**

season, the precipitation comes mainly in the form of thunderstorms that occur on the average of every other day and generally last for only 1 or 2 hours. Moderately high winds, which occasionally accompany the thunderstorms, occur for short periods.

Between August and November, tropical storms occasionally sweep across the county. Most of these develop over the Caribbean Sea near the West Indies. The heavy rains that accompany such storms are generally more damaging to crops than the wind, but the wind may destroy buildings, tall vegetation, and the fruit on citrus trees. Generally, the damage is confined to a storm path that is between 40 and 75 miles wide (Doolittle, 1989).

#### **2.4 SURFACE HYDROLOGY**

Figure 2-2 shows the site drainage. As shown, most of the site drains to the north and west via a swale which is approximately 2 feet deep. The swale terminates in the northwestern corner of the site where the swale is approximately 20 feet wide and 5 feet deep. During most rainfalls, it is likely that stormwater collecting in the swale percolates and evaporates, and does not run off the site.

See  
Figure  
2-2

The eastern portion of the site drains to the east into the storm drain system along Orange Blossom Trail. Drainage from the southern portion of the site and the southwestern corner of the site flows westward along the railroad tracks into a stormwater retention pond located on the west side of the North Brothers Insulation Company building.

#### **2.5 GEOLOGY**

Orange County is underlain mostly by marine limestone, dolomite, shale, sand and anhydrite to about 6,500 feet at which depth granite and other crystalline rocks of the basement complex occur. Overlying the crystalline basement in succession are the Eocene age lake City limestone (> 700 feet thick) and the Avon Park limestone (400-600 feet thick). Overlying the Avon Park is the Ocala limestone (0-125 feet thick) which may be highly eroded or missing in some parts of Orange County. Together these formations comprise the Floridan aquifer.

Overlying the Eocene age formations is the Miocene age Hawthorn formation (0-200 feet thick) consisting of fine sand, clayey sand, silt and clay. The contact of the Hawthorn formation with the overlying deposits is gradational. The undifferentiated sediments above the Hawthorn formation may include the Caloosahatchee marl; thick deposits of red clayey sand; and marine terrace deposits. The marine terrace deposits consist mostly of loose unsorted quartz sand with varying amounts of organic matter and occasional seams of clay.

The undifferentiated sediments are 0-200 feet thick. The uppermost unconsolidated sediments consist of Pleistocene to recent age sand deposits which comprise the upper 40 feet of the soil profile.

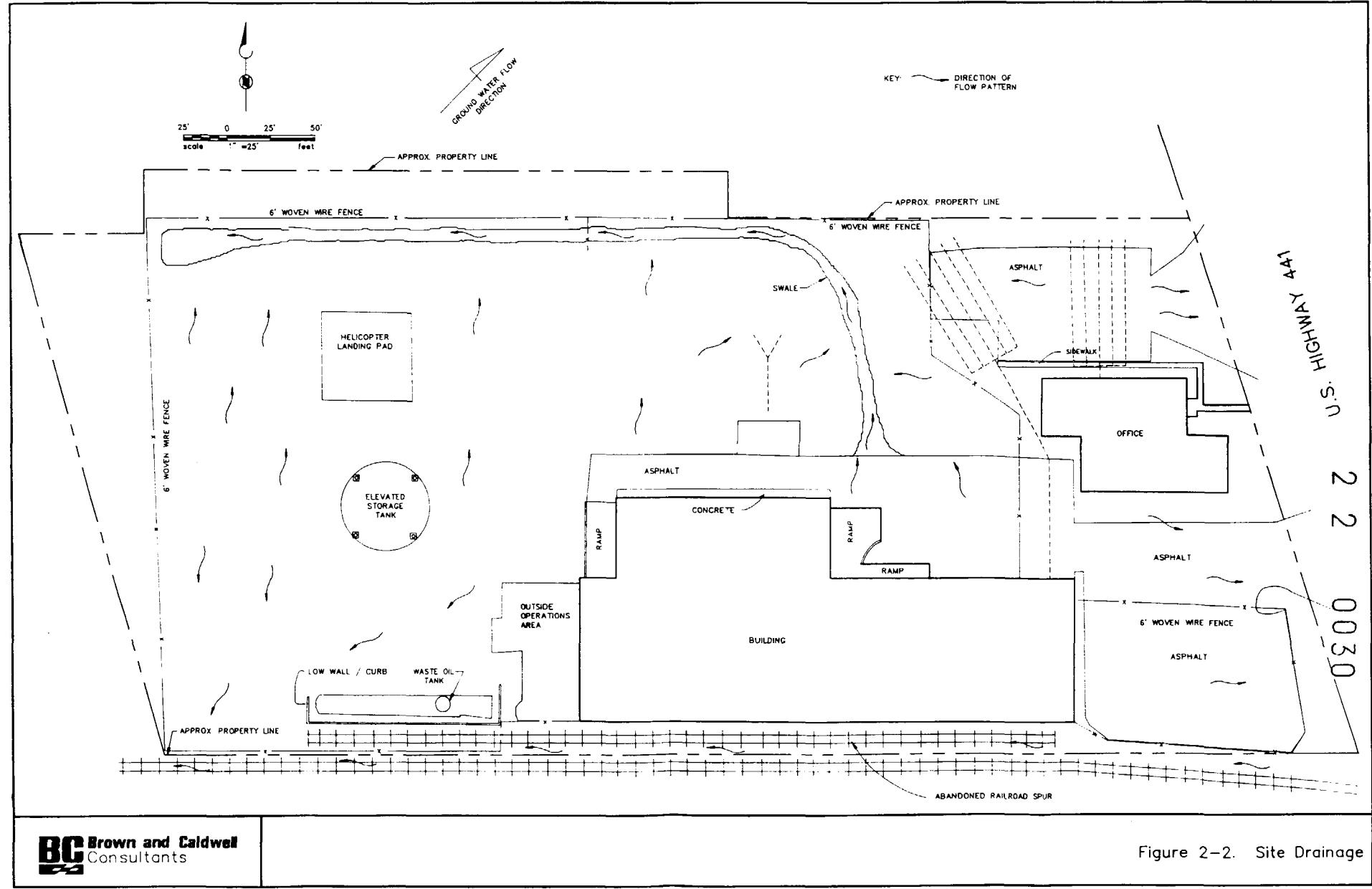


Figure 2-2. Site Drainage

**CHAPTER 2. ENVIRONMENTAL SETTING****2.5.1 Site Geology**

As shown on the soil boring logs and monitor well construction logs from the contamination assessment (Appendix A), the surficial geology is relatively uniform throughout the site. Surficial soils consist of disturbed local deposits and in some places, a white or black sandy fill is present. This fill extends to approximately 3 feet below land surface. Below the surficial fill, subsurface materials consist of tan to very dark brown, fine to very fine, sometimes silty, well sorted, moderately well rounded quartz sands. At approximately 33 feet a medium grey clay or silty clay is encountered. This clay bed is considered to underlie the entire site. Figure 2-3 indicates the location of the lithologic profile. The lithologic profile is provided as Figure 2-4.

See  
Figures  
2-3 and  
2-4

**2.6 HYDROGEOLOGY**

The groundwater regime within Orange County consists of an unconfined aquifer, extending from near land surface to a depth of approximately 40 feet, and the deeper and more extensive Floridan aquifer. The unconfined aquifer is separated from the Floridan aquifer by a thick confining layer of clays, clayey sands, and silty sands. Within the central Florida area the confining layer usually consists of the Hawthorn formation. Occasional minor aquifers may occur in relatively clean sand zones within the confining layer. The majority of the water wells that have been constructed into the unconfined aquifer in the Orange county area are of small diameter, but generally provide water sufficient for domestic purposes. In general, these wells may average 5 to 10 gallons per minute (gpm). The groundwater surface occurs at shallow depths in the vicinity of the site, and is usually located within 5 feet of the ground surface. The potentiometric surface in both the unconfined aquifer and deeper aquifer fluctuates seasonally, generally varying less than 5 feet for the unconfined aquifer and in excess of 5 feet for the Floridan aquifer. Regional groundwater flow directions are to the northeast and east (Figure 2-5).

See  
Figure  
2-5

The Floridan aquifer is highly permeable and extensive in area. It is the principle potable water producing zone for Orange County. The Floridan aquifer is primarily composed of limestone (Eocene age) and is generally between 1,500 and 2,000 feet thick. Most all of the industrial wells in the vicinity have been constructed into the Floridan aquifer. The top of the Floridan aquifer is over 150 feet deep in the vicinity of the site.

The primary source of recharge for the unconfined aquifer is rainfall which permeates the near-surface sands. The Floridan aquifer in Orange County receives most of its recharge by percolation of surface water and rainfall in the western highlands where the confining beds are locally rather thin and semipermeable.

220032

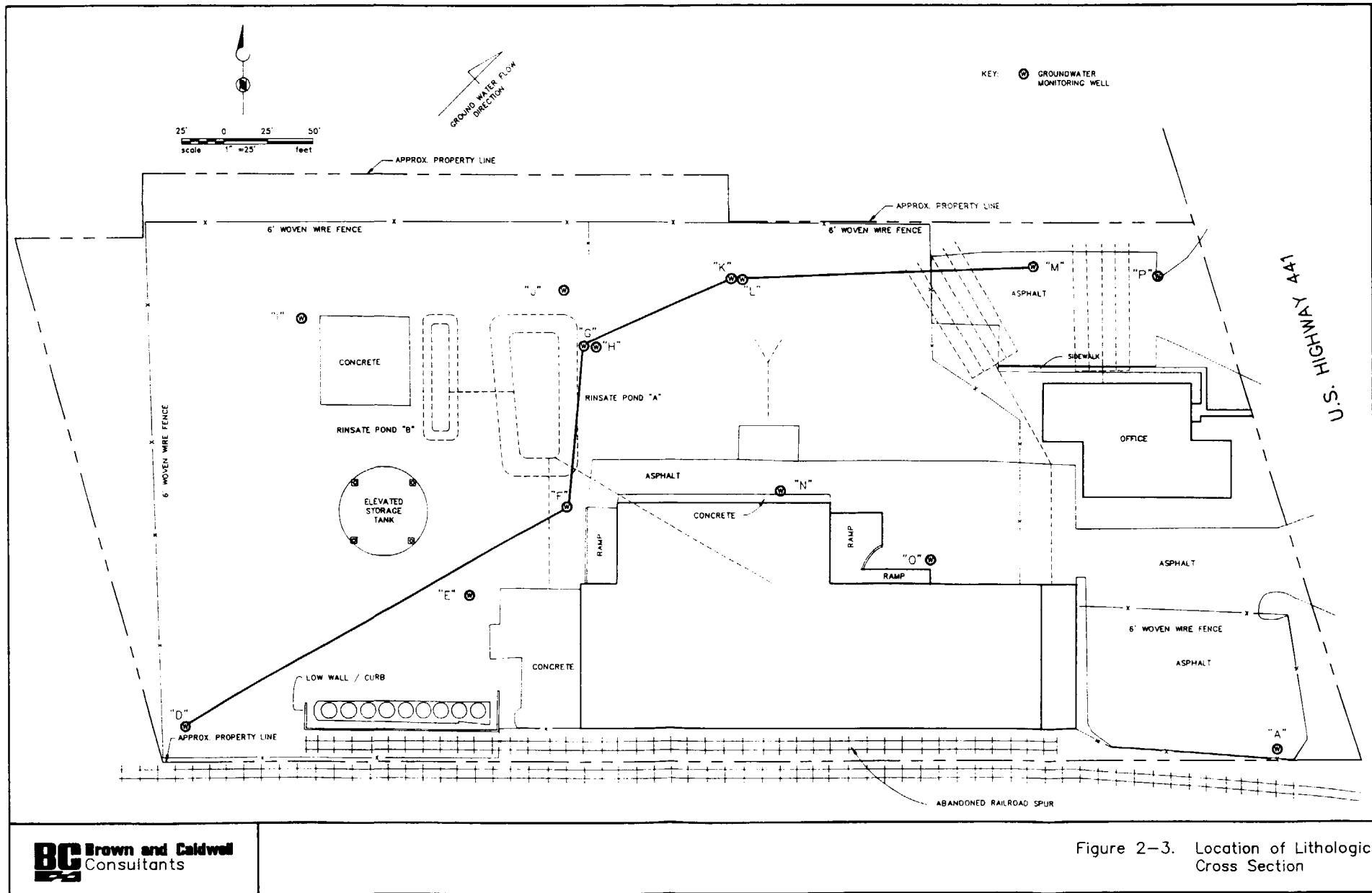
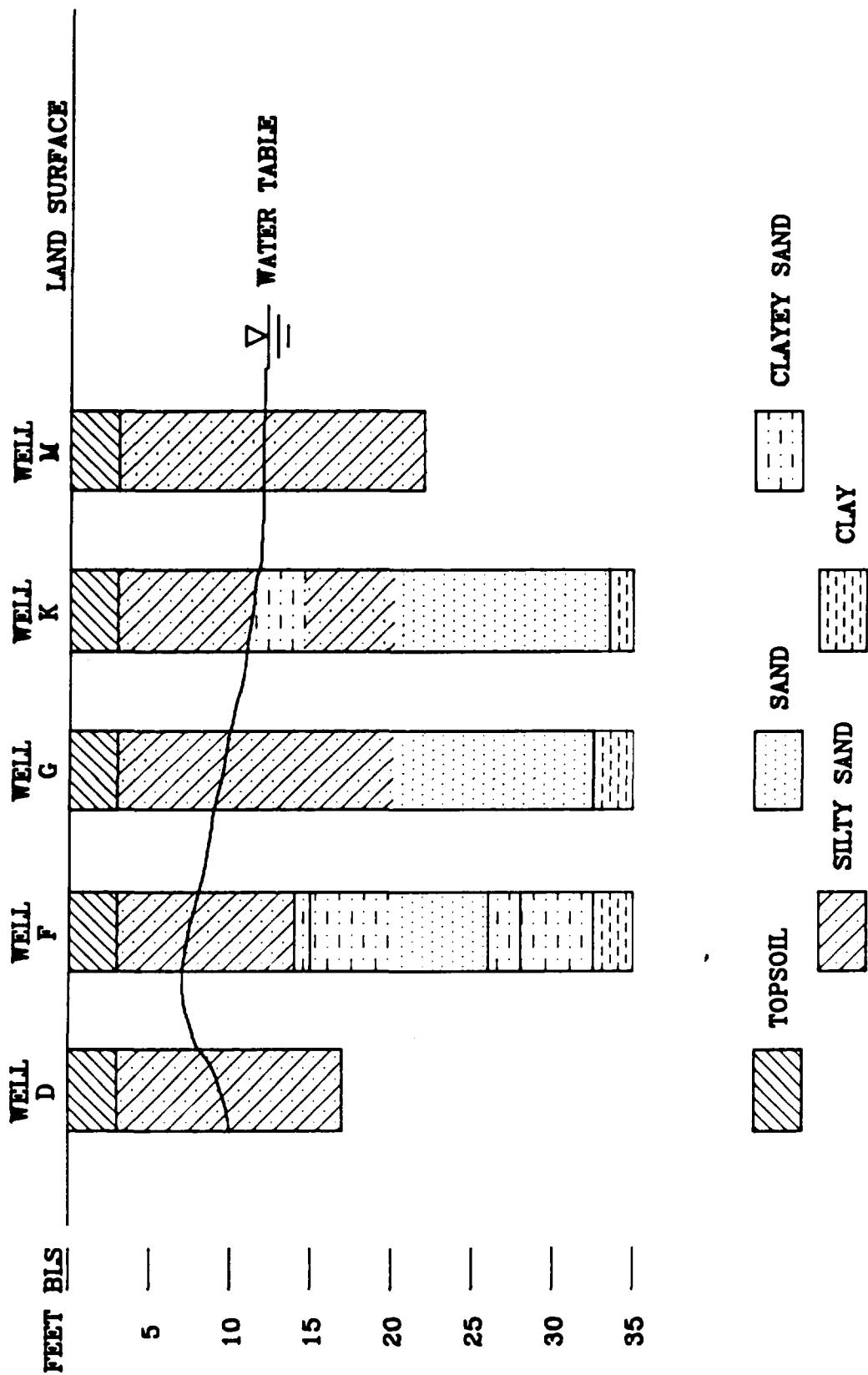


Figure 2-3. Location of Lithologic Cross Section



**Brown and Caldwell**  
Consultants

Figure 2-4. Lithologic Profile

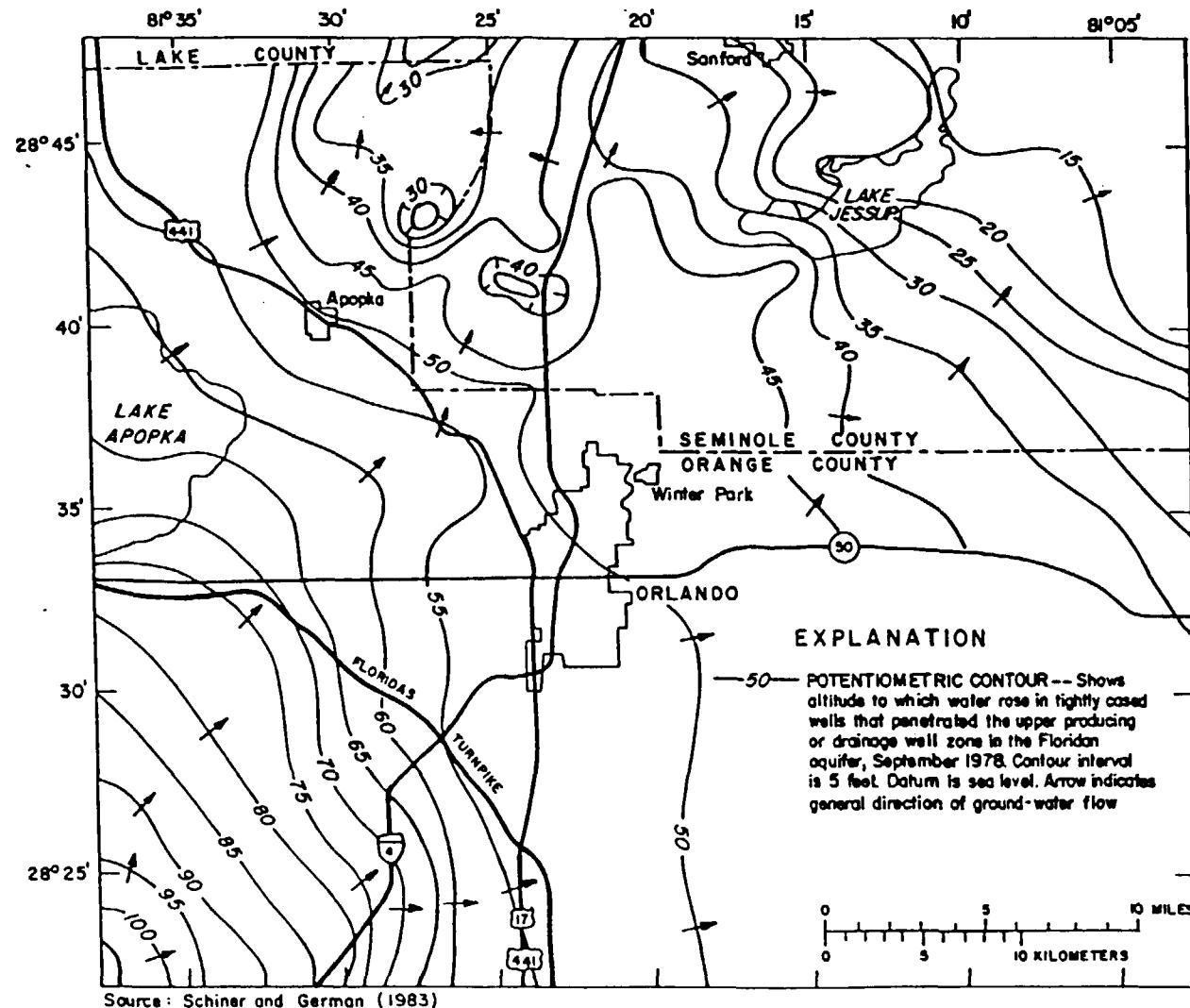


Figure 2-5. Potentiometric Surface of the Upper Floridan Aquifer

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**CHAPTER 2. ENVIRONMENTAL SETTING****2.7 WATER QUALITY**

The quality of groundwater in the unconfined aquifer can exhibit considerable variation depending on a number of factors, including the composition of the aquifer, shallow soil conditions, and proximity to sources of surface contamination (i.e., farmland fertilizers, irrigation canals, effluent disposal, septic tanks, industrial waste disposal, etc.) Normally, the unconfined aquifer in this area is not used for potable water supply. However the unconfined aquifer is classified as G-II groundwater and, therefore, discharges to the aquifer must meet water quality criteria for a potable water supply source.

## CHAPTER 3.0

### ***FIELD INVESTIGATION METHODS***

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Field investigation methods were designed to provide data necessary to determine the degree and extent of soil and groundwater contamination at the site, and to assess the hydrogeology of the site. The activities conducted at the site included site clearing, a ground penetrating radar survey, groundwater monitor well installation and sampling, soil and sediment sampling, and aquifer testing. Each method is described in the following sections.

#### **3.1 SITE CLEARING**

Site clearing activities were conducted from August 20 to August 25, 1990. The objective of the site clearing operation was to remove inert debris and dense vegetation from the northern and western portions of the site to facilitate subsequent field investigation activities. OHM Corporation was contracted to complete this phase of the project. A Brown and Caldwell representative was present on site during all of the clearing operations.

A decontamination area was constructed on the concrete helicopter pad, located in the northwest area of the facility. A 490D track hoe and bobcat loader were utilized to sort and stage site debris prior to decontamination. Decontamination consisted of using a steam cleaner to remove any dirt or residue from the surface of the debris. Specific site debris included scrap wood, fencing, telephone poles, machine parts, scrap metal, and automobile parts. Drums present on the site containing free liquid were placed on visqueen in the truck service bays for temporary storage. In addition, wastewater generated by the decontamination operation was collected in drums which were also moved to the truck service bays for temporary storage. All empty drums found on site were decontaminated with a high pressure steam cleaner, crushed and then loaded into 20-yard roll-off containers with the other site debris and shipped for offsite disposal at the Orange County landfill. A total of five roll-off containers were filled and sent for disposal. A bushhog, equipped with a water spray attachment to minimize fugitive dust emissions, was then used to cut the vegetation (shrubs, weeds, grass, etc.) present on the site.

#### **3.2 GROUND PENETRATING RADAR SURVEY**

A ground penetrating radar (GPR) survey was completed at the site using the services of Detection Sciences, Inc., of Boston, Massachusetts. The survey took place over two days (September 6 - 7, 1990).

The GPR system is an echo-location system which emits a brief impulse of radio energy lasting only a few nanoseconds. The length of time it takes for the radar echoes to return to the antenna corresponds to the depth below the surface the radar wave has travelled. By recording these depth dependent echoes on a scanning time-based chart recorder, a vertical

**CHAPTER 3. FIELD INVESTIGATION METHODS**

profile of the ground is generated. This vertical profile shows the longitudinal distribution of subsurface strata and other features over which the radar antenna has passed.

At the interface of two materials, the radar impulse undergoes an abrupt change in velocity. It is this change in velocity which allows the identification of subsurface strata and other buried materials.

The field procedure involves establishing a grid over which the radar antenna is towed. The grid is spaced to give maximum coverage of the site. The antenna is towed by a survey van which is equipped with a strip-chart recorder, tape recorder and electronic controls. A fifth wheel odometer at the back of the van automatically logs the distance travelled.

Grid lines were established using previously surveyed north/south and east/west lines. The grid was marked with 10-foot centers. Occasional deviations from the grid lines were necessary to avoid objects that would impede the GPR antenna. The portion of the site incorporating the rinsate ponds was run on a 5-foot grid to give 100 percent coverage.

The strip chart records and the tape recorded data were evaluated by Detection Sciences, Inc., and submitted in a report to Brown and Caldwell. A subsurface map was generated (Figure 3-1) to aid in selection of the location of several soil borings. The GPR report is contained in Appendix B.

See  
Figure  
3-1

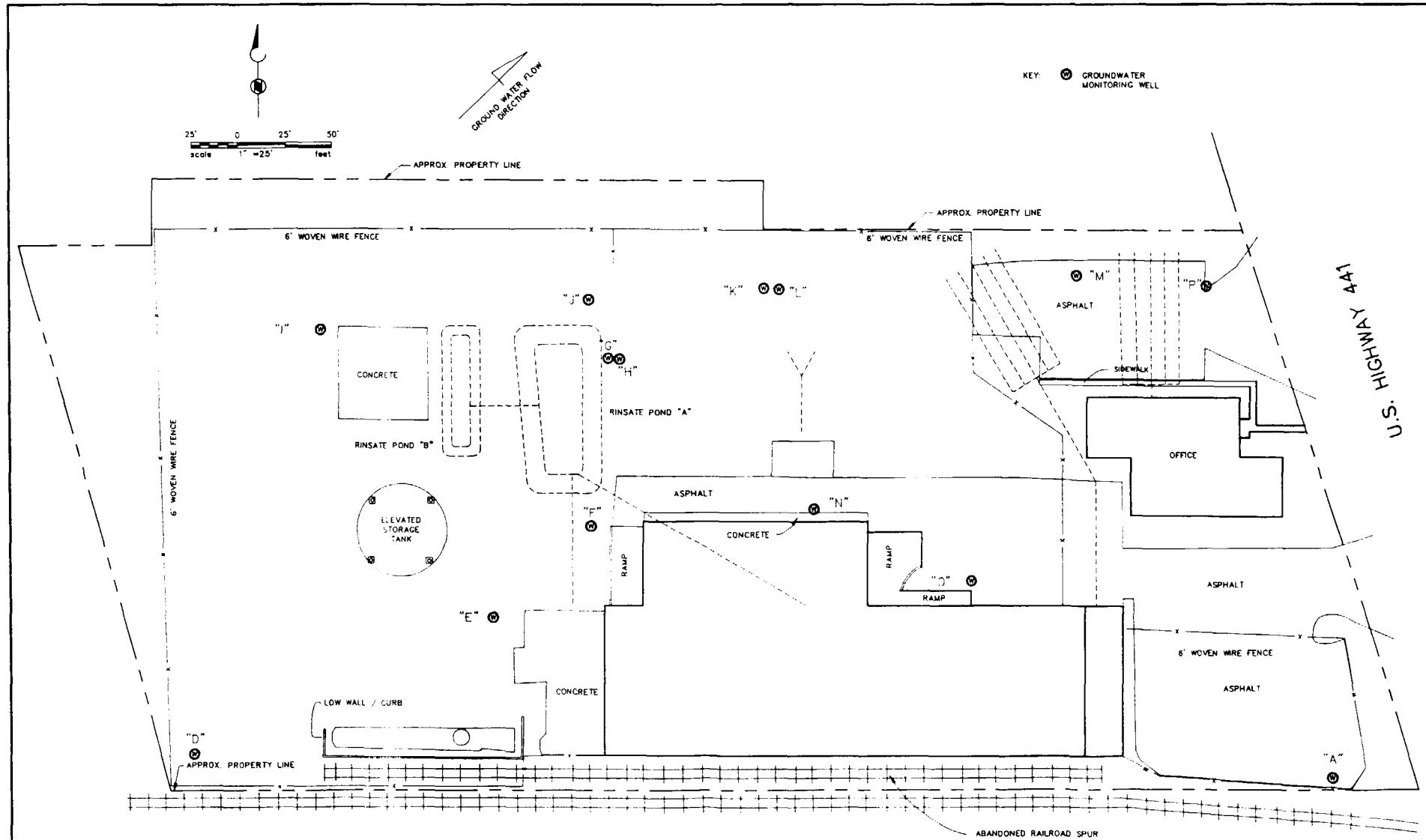
### 3.3 GROUNDWATER MONITOR WELL INSTALLATION AND SAMPLING

Fourteen groundwater monitor wells were installed at the site to determine the degree and extent of groundwater contamination. Of the fourteen monitor wells, nine are 17-feet deep, wells M and P are 22-feet deep, and F, G, ad K are 33-feet deep. Locations of wells are given on Figure 3-2. The drilling was performed by a licensed well drilling contractor (Groundwater Protection, Inc. of Orlando, FL) under the supervision of a Brown and Caldwell geologist.

See  
Figure  
3-2

Prior to drilling, the exclusion zone was delineated with yellow caution tape and areas were set aside for staging, support and decontamination. All drilling was conducted under level 'C' personal protective equipment and work and break schedules were established to reduce the possibility of heat stress. During drilling, the work zone and drill cuttings were continuously monitored with an OVA to detect volatile organics in the area.

Drilling began on September 10, 1990. Each monitor well was logged and described by the onsite Brown and Caldwell geologist as it was being drilled. Data included in the well drilling log is as follows:



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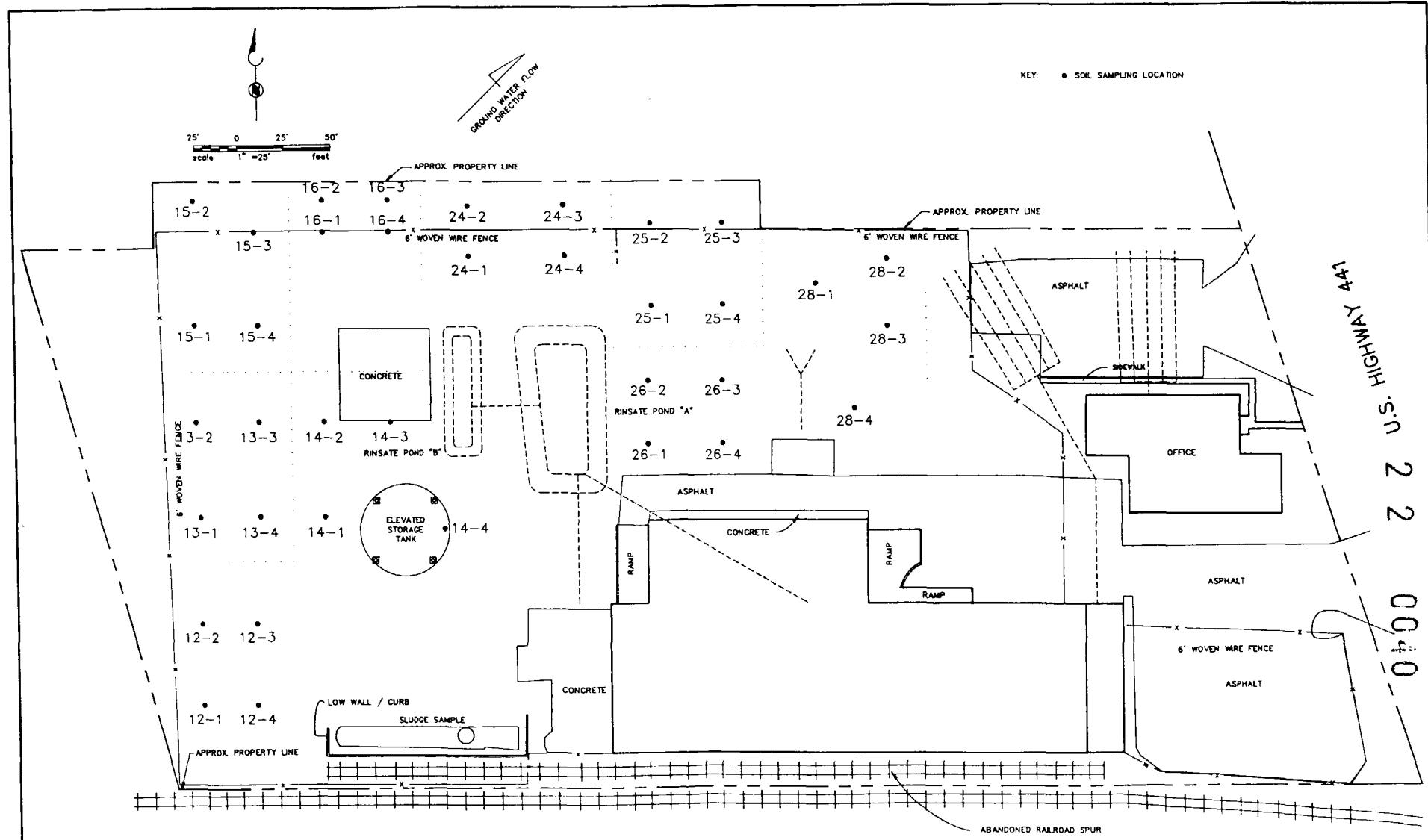
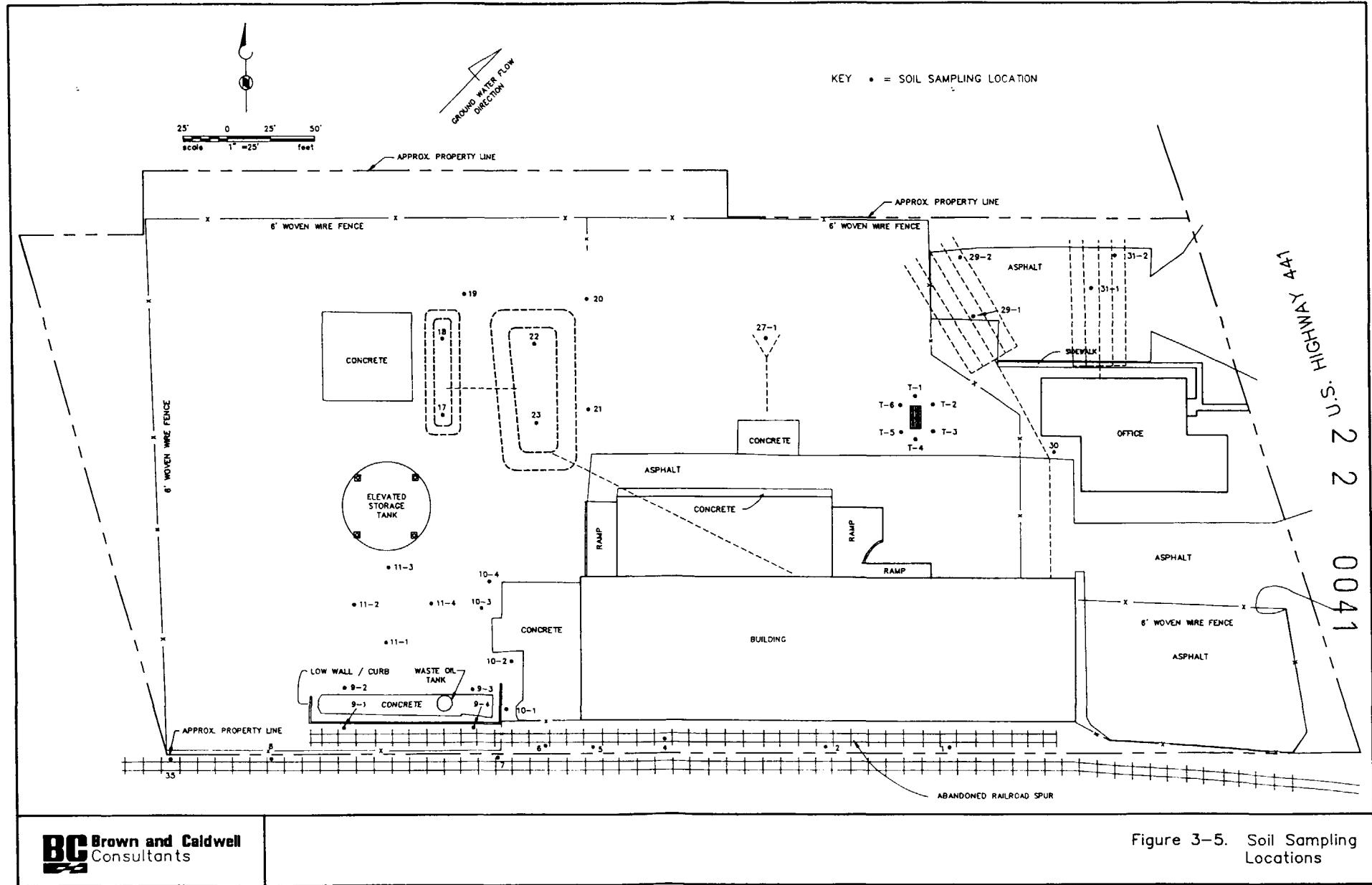


Figure 3-4. Soil Sampling Locations on Northern and Western Portions of the Site



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**CHAPTER 3. FIELD INVESTIGATION METHODS**

1. depth intervals in feet and tenths of feet;
2. drill cutting descriptions including soil/rock classification, secondary components and estimated percentage, color, plasticity, and estimate of relative moisture content;
3. depth to water as it was first encountered during drilling;
4. drilling equipment used;
5. drilling sequence;
6. special problems;
7. dates for start and completion of each well;
8. lithologic contacts; and
9. blow counts for each split spoon sample taken.

Drilling logs are included in Appendix A.

All wells were installed using hollow stem auger drilling techniques. Two-foot split spoon samples were collected at 5-foot intervals for logging and description. The deep wells were drilled with a continuous flight auger which allowed for a lithologic description of the entire depth of the well. In well locations that were covered with concrete, the concrete was first cut out with a concrete saw to prevent damage to the auger head and to prevent transport of contaminants from the surface down into the hole.

The wells were constructed using 2-inch diameter Schedule 40 polyvinyl chloride (PVC) monitor well casing and 2-inch diameter .010 slot size, Schedule 40 mill slotted PVC screen. All PVC casing had mill-threaded flush joints; no glue or heat welded joints were used.

The annular zone around the monitor well casing was filled with 20/30 Silica sand to 2 feet above the screen. A 1 -to-2-foot bentonite seal was tremmied into the annular space above the sand pack. One gallon of deionized water was poured over the pellets for hydration. The pellets were allowed to hydrate a minimum of eight hours before the remaining annulus was cement-grouted to the land surface.

**CHAPTER 3. FIELD INVESTIGATION METHODS**

A 2-foot by 2-foot by 4-inch concrete pad was installed to prevent percolation. A 6-inch square locking steel protective casing was installed at land surface to prevent unauthorized access to the well. Weepholes were drilled at the bottom of the protective casing. Each well was labeled with indelible ink on the PVC casing riser inside the locking steel cover for identification. An example well completion log is shown in Figure 3-3. Well completion logs are presented in Appendix A.

See  
Figure  
3-3

All drilling equipment was thoroughly decontaminated between each borehole. Decontamination procedures include:

1. Steam cleaning and wire brushing to remove particulate matter and surface films.
2. Clean with tap water and laboratory detergent.
3. Rinse with tap water.
4. Rinse with deionized water.
5. Rinse with pesticide grade isopropanol.
6. Rinse with organic free deionized water and allow to air dry as long as possible.
7. Wrap with aluminum foil if equipment must be stored or transported.

All PVC materials were ink-free and decontaminated in the same manner minus the isopropanol rinse. Latex gloves were used when handling all decontaminated material.

**Well Development.** After allowing the cement pad around each well to cure overnight, the wells were developed using a centrifugal pump until the water was clean and sediment free, or until temperature, pH and specific conductivity stabilized. Dedicated suction hoses were used for each well and the development water was disposed of onsite. Several wells had pungent odors and would not clear on development. The water from these wells was contained in 55-gallon drums and stored in the truck service bays onsite.

The following information was recorded in the log book for each well:

1. Well designation
2. Date of installation
3. Date of development
4. Static water level
5. Specific conductance, temperature and pH taken during development
6. Depth of well from top of casing
7. Screen length
8. Characteristics of water removed - odor, color, turbidity
9. Description of surge technique
10. Quantity of water removed

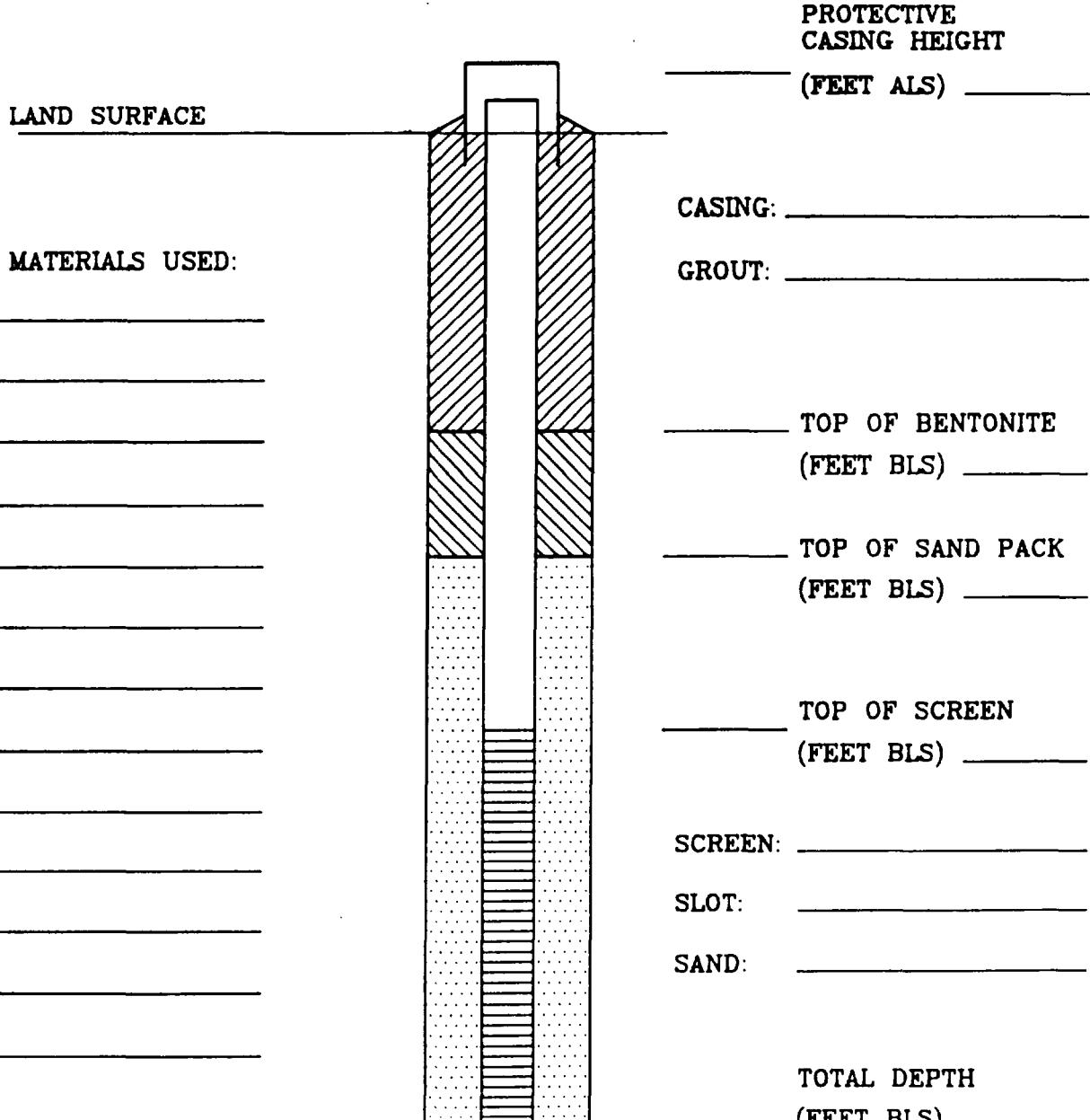
2 2 0044

**WELL COMPLETION LOG**

PROJECT: \_\_\_\_\_

WELL NUMBER: \_\_\_\_\_

DRILLING METHOD: \_\_\_\_\_



COMPLETION DATE: \_\_\_\_\_

LOGGED BY: \_\_\_\_\_


**Brown and Caldwell**  
 Consultants

Figure 3-3. Well Completion Log

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**CHAPTER 3. FIELD INVESTIGATION METHODS**

Groundwater Sampling. The groundwater monitor wells were sampled to determine the degree and extent of groundwater contamination at the site. Sampling took place after the wells had reached equilibrium (at least 5 days after development). Standard operating procedures as specified in Standard Operating Procedures and Quality Assurance Manual, USEPA, Region IV, were implemented.

Groundwater sampling began on October 15, 1990. Well depths from top of casing and depths to water from top of casing were measured and recorded. Casing volume was calculated using the equation:

$$V = .041d^2h$$

V = volume of casing in gallons

d = diameter of well in inches

h = depth of water in well in feet

Three to five well volumes of water were purged from each well using a dedicated suction hose and a peristaltic pump. A decontaminated stainless steel bailer was used to sample the well and separate disposable gloves were used for each well. Sampling equipment was decontaminated by the following procedure:

1. Clean with tap water and detergent, steam clean if necessary.
2. Rinse thoroughly with deionized water.
3. Rinse with the pesticide grade isopropanol.
4. Rinse with organic free deionized water and allow to air dry as long as possible.
5. Wrap with aluminum foil if equipment is to be stored or transported.

Sampling and purging equipment was prevented from ground contact after decontamination by wrapping in aluminum foil or placing on polyethylene sheeting until use.

Temperature, pH and specific conductance were measured during purging of the well. Instruments were calibrated using laboratory standards. Samples were collected from wells suspected of being free of contamination before sampling wells suspected or known to contain contaminants.

Data collected during sampling included:

1. well designation
2. date and time of sampling
3. well depth and static water level
4. pumping rate and volume of water removed
5. water quality measurements
6. sample tag numbers and laboratory analysis to be performed.

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**CHAPTER 3. FIELD INVESTIGATION METHODS**

Samples to be analyzed for metals were preserved with nitric acid and the pH was measured by pouring a small amount of sample over the pH paper. pH was adjusted with nitric acid to < 2.0.

Quality assurance/quality control (QA/QC) samples were collected and sent to the laboratory. One trip blank accompanied each cooler of samples. One equipment blank, one field blank and three duplicate samples were taken. The equipment blank was taken by pouring deionized organic free water through a decontaminated bailer into the sample jars. The field blank was taken by pouring deionized organic free water directly into the sample jars. The duplicate samples were taken by alternating bottle filling for each analyte.

Sample jars were tagged with Brown and Caldwell labels, taped if appropriate, sealed with a custody seal, and finally taped in plastic bags and logged on a chain-of-custody form. Samples were stored in coolers at 4 degrees Celsius (on ice) and shipped overnight via Federal Express to the laboratory.

Spikes and blanks provided by the EPA's Technical Assistance Team (TAT) representative were included for laboratory analysis.

### 3.4 SOIL SAMPLING

A total of 40 soil samples and one pond sediment sample were taken to determine location, degree and extent of soil contamination. Samples were taken using a stainless steel spoon, a stainless steel hand auger or a drill rig and split spoon sampler, depending on depth of the sample. Staging, support and decontamination areas were set up prior to sampling. Areas covered by concrete were cut using an air hammer to allow access to the soil underneath.

Soil sampling techniques followed standard operating procedures as specified in Standard Operating Procedures and Quality Assurance Manual, USEPA, Region IV. When soil samples were taken from an auger, the top third of the bucket contents were discarded prior to collecting the sample from the auger. The VOA sample fraction was placed directly into the sample container without mixing. The soil removed from the bucket was placed in a decontaminated pyrex pan and mixed using the quarter-mix method. Composite samples were taken using one auger and all contents placed in one pan and mixed together before placing in sample jars. The VOA fractions was taken from each auger bucket before the soil was placed in the pan for mixing. Sampling equipment was decontaminated between samples by the following procedure:

1. Clean with tap water and detergent, steam clean if necessary.
2. Rinse thoroughly with deionized water.
3. Rinse with the pesticide grade isopropanol.
4. Rinse with organic free deionized water and allow to air dry as long as possible.
5. Wrap with aluminum foil if equipment is to be stored or transported.

**CHAPTER 3. FIELD INVESTIGATION METHODS**

Sampling procedures and data were recorded in the field logbook. Data collected at the time of sampling included:

1. Sample site number and location;
2. Date and time;
3. Pertinent sample and boring observations, including depth, odor, soil composition, penetration rate of auger, etc.; and
4. Ambient air quality readings measured by an OVA.

Soil boring locations are shown on Figures 3-4 and 3-5. Two sample locations were modified from those specified in the Work Plan (Brown and Caldwell, July, 1990). Sample location 16 was moved northward due to the location of the helicopter pad, and sample location 14-4 was moved into line with 14-1 since it was possible to sample under the water tower.

See  
Figures  
3-4 and  
3-5

Depth intervals for each boring are shown in Table 3-1. Borings with more than one sample interval were made using one split spoon and both samples were taken before moving to the next location. The drill rig was decontaminated between each boring location by the procedure described in Section 3.3.

See  
Table  
3-1

Soil sampling began on October 3, 1990. Hand-augering was performed by Brown and Caldwell personnel. Split spoon sampling was conducted by a licensed well drilling contractor under the supervision of a Brown and Caldwell geologist.

Five samples were collected in addition to those specified in the Work Plan (Brown and Caldwell, July, 1990). A sample of a sludge-like material was taken from the sump around the above ground storage tank pad. Six soil borings were constructed around a possible underground storage tank to ten feet below land surface with each boring logged and monitored by an OVA. Two discreet samples were taken from this area for analysis.

A sediment sample was taken from the stormwater retention pond located adjacent to the site at North Brothers Insulation Company, west of the site. This sample was a composite of four locations within the pond. A fifth additional sample was taken at the far southwest corner of the site beside the rail spur.

QA/QC blanks and duplicates were taken in accordance with the work plan. Equipment blanks were taken by pouring deionized water through a decontaminated auger into sample jars. Field blanks were taken by pouring deionized water directly from the water tank into the sample jars. Duplicate samples were taken by alternating bottle filling for each analyte.

## **APPENDIX C**

### ***QUALITY ASSURANCE ANALYSIS AND LABORATORY DATA***

**Quality Assurance (QA) Analysis****Chevron/Orlando Site****I. FIELD QA**

Field QA samples included the following sample types:

- Equipment Blanks to detect possible cross contamination resulting from insufficient sampling equipment decontamination,
- Field Blanks to detect possible cross contamination resulting from ambient conditions during sampling,
- Trip Blanks to detect possible cross contamination resulting from improper sample and container handling, and
- Duplicate Samples to determine the precision of the sampling process.

**Blank Analysis**

Chloroform was detected (3 ug/l) in a field blank collected during the deep soil sampling, and benzyl alcohol was detected (51 ug/l) in a field blank collected during the rail spur area sampling. These compounds were not detected in any sample collected during any sampling event, and consequently have no effect on the analytical data.

Bis (2-ethylhexyl) phthalate was also detected (99 ug/l) in the field blank from the rail spur area. This compound was detected in a single soil sample (SB-31, 76,000 ug/l) at a level 3 orders of magnitude greater than that of the blank.

No other contaminants were detected.

**Duplicate Analysis****Soils**

Duplicates were collected for soil samples SB-26 and SB-29. Due to elevated detection limits resulting from matrix interference, duplicate organic data is difficult to evaluate. Ethion, however, was detected in both duplicates of SB-26 with a precision of 36.22% relative standard deviation (RSD) as determined by:

$$\%RSD = |A-B| / ((A+B)/2) * 100$$

Where: A = Value of replicate A  
B = Value of replicate B.

Arsenic, chromium, and zinc were detected in both duplicates of SB-

29 with precisions of 16.67%, 7.69%, and 7.41% RSD, respectively. The average precision for metals was 10.59% with a standard deviation of 4.30%.

Overall average precision for soil was 17.00% with a standard deviation of 11.71%, well within acceptable limits of variability.

#### Groundwater

Groundwater duplicates were collected from MW-A, MW-D, and MW-H. Chromium and zinc were detected in both replicates of MW-A and MW-D with average precisions of 77.79% and 13.03% RSD, respectively. Duplicates of MW-H provided data for a wide range of organics, arsenic, chromium, and zinc with average precision equalling 54.11% RSD with a standard deviation of 48.35%.

Variability in precision for the groundwater samples ranged from 0.00% to over 100%. Organochlorine pesticides and other base neutral/acid extractables exhibited good precision with an average RSD of 13.58%. Volatile analysis became more variable with an average RSD of 56.24%. Metals were the most variable with an average of 70.89% RSD and a standard deviation of 41.77%.

During sampling, all samples for volatile organic analysis were collected from a single bailer volume, then randomly divided between the two duplicates. Due to the random nature of container division between duplicates, it is impossible to determine if order of filling influenced volatiles concentrations, and subsequent duplicate variability.

Field notes indicate that groundwater samples were turbid and brown to gray in color, suggesting a high content of suspended silts and other particulates. The presence of these particulates and their effect on contaminant concentrations due to adsorption and desorption could account for much of the variability, particularly with respect to metals. Filtration of future samples would eliminate this potential source of error.

#### II. LABORATORY QA

Data from the laboratory duplicate and matrix spike analysis indicates that the data meets the goals for precision and accuracy defined in SW-846. No contaminants were detected in laboratory blanks. The laboratory data is included in this appendix.

## Chevron Orlando Site Assessment

**Shallow Soil Sample Analytical Results, Duplicate Analysis****Field Sampling, 1990**

<u>Parameter</u>	<u>Units</u>	<u>SB-26</u>	<u>DUP-26</u>	<u>%RSD</u>
1,4-Dichlorobenzene	ug/kg	970	BDL	NA
4,4'-DDD	ug/kg	*	51000	NA
Chlordane	ug/kg	87000	*	NA
Ethion	ug/kg	75	52	36.22%
Average Precision:			+/-	36.22%
Standard Deviation:				NA

**Deep Soil Sample Analytical Results, Duplicate Analysis****Field Sampling, 1990**

<u>Parameter</u>	<u>Units</u>	<u>SB-29</u>	<u>DUP-29</u>	<u>%RSD</u>
Xylenes	ug/kg	BDL	24	NA
Arsenic	mg/kg	1.3	1.1	16.67%
Chromium	mg/kg	5.4	5	7.69%
Zinc	mg/kg	2.8	2.6	7.41%
Average Precision:			+/-	10.59%
Standard Deviation:				4.30%

**Overall Average Precision for Soil:** +/- 17.00%**Standard Deviation:** 11.71%

## Chevron Orlando Site Assessment

**Groundwater Sample Analytical Results, Duplicate Analysis**  
**Field Sampling, 1990**

<u>Parameter</u>	<u>Units</u>	Well Identification		
		<u>MW-A</u>	<u>DUP-A</u>	<u>%RSD</u>
Chromium	mg/l	0.1	0.043	79.72%
Zinc	mg/l	0.054	0.12	75.86%
Average Precision:		+/-		77.79%
Standard Deviation:				NA

**Groundwater Sample Analytical Results, Duplicate Analysis**  
**Field Sampling, 1990**

<u>Parameter</u>	<u>Units</u>	<u>MW-D</u>	<u>DUP-D</u>	<u>%RSD</u>
Aldrin	ug/l	0.014	0.014	0.00%
Endosulfan I	ug/l	BDL	0.025	NA
Chromium	mg/l	0.011	0.011	0.00%
Zinc	mg/l	0.035	0.052	39.08%
Average Precision:		+/-		13.03%
Standard Deviation:				18.42%

## Chevron Orlando Site Assessment (Continued)

**Groundwater Sample Analytical Results, Duplicate Analysis**  
**Field Sampling, 1990**

<u>Parameter</u>	<u>Units</u>	<u>MW-H</u>	<u>DUP-H</u>	<u>%RSD</u>
Benzene	ug/l	97	54	56.95%
Toluene	ug/l	76	54	33.85%
Xylene	ug/l	1300	640	68.04%
Ethylbenzene	ug/l	220	130	51.43%
Chlorobenzene	ug/l	130	120	8.00%
1,4-Dichlorobenzene	ug/l	72	80	10.53%
1,2-Dichloroethane	ug/l	56	BDL	NA
1,1-Dichloroethene	ug/l	48	55	13.59%
Methylene Chloride	ug/l	290	68	124.02%
1,1,2-Trichloroethane	ug/l	220	39	139.77%
a-BHC	ug/l	2.4	2.8	15.38%
b-BHC	ug/l	7.7	8.2	6.29%
g-BHC	ug/l	1.7	1.7	0.00%
4,4'-DDD	ug/l	2.6	5.5	71.60%
Endosulfan I	ug/l	BDL	1.5	NA
Isopherone	ug/l	56	55	1.80%
2,4-Dimethylphenol	ug/l	BDL	47	NA
Phenol	ug/l	46	46	0.00%
Demeton-O	ug/l	130	22	142.11%
Arsenic	mg/l	0.03	0.092	101.64%
Chromium	mg/l	0.011	0.051	129.03%
Zinc	mg/l	BDL	0.027	NA
<b>Average Precision:</b>		+/-	<b>54.11%</b>	
<b>Standard Deviation:</b>				<b>51.00%</b>

<b>Overall Average Precision for Liquid:</b>	+/-	<b>50.81%</b>
<b>Standard Deviation:</b>		<b>48.35%</b>

<u>Summary by Analyte Class</u>	<u>Mean %RSD</u>	<u>Standard Deviation</u>
Metals:	70.89%	41.77%
Volatiles:	56.24%	45.30%
Organochlorines/BNA's:	13.58%	24.25%

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## REPORT OF RESULTS

Page 1

LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER	11075-1	
<hr/>		
Volatile Organics		
Benzyl chloride, ug/kg dw	<110	
bis(2-Chloroethoxy) methane, ug/kg dw	<110	
Bis(2-chloroisopropyl)ether, ug/kg dw	<110	
Bromobenzene, ug/kg dw	<110	
Bromodichloromethane, ug/kg dw	<110	
Benzene, ug/kg dw	<110	
Bromoform, ug/kg dw	<110	
Bromomethane, ug/kg dw	<110	
Carbon Tetrachloride, ug/kg dw	<110	
Chloroacetaldehyde, ug/kg dw	<110	
Chlorobenzene, ug/kg dw	2400	
Chloroethane, ug/kg dw	<110	
Chloroform, ug/kg dw	<110	
1-Chlorohexane, ug/kg dw	<110	
2-Chloroethylvinyl Ether, ug/kg dw	<110	
Chloromethane, ug/kg dw	<110	
Chloromethyl methyl ether, ug/kg dw	<110	
Chlorotoluene, ug/kg dw	<110	
Dibromochloromethane, ug/kg dw	<110	
Dibromomethane, ug/kg dw	<110	
1,2-Dichlorobenzene, ug/kg dw	<110	
1,3-Dichlorobenzene, ug/kg dw	<110	
1,4-Dichlorobenzene, ug/kg dw	970	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		11075-1
Dichlorodifluoromethane, ug/kg dw	<110	
1,1-Dichloroethane, ug/kg dw	<110	
1,2-Dichloroethane, ug/kg dw	<110	
1,1-Dichloroethene, ug/kg dw	<110	
1,2-Dichloropropane, ug/kg dw	<110	
1,3-Dichloropropylene, ug/kg dw	<110	
Ethylbenzene, ug/kg dw	1400	
Methylene Chloride, ug/kg dw	<110	
1,1,2,2-Tetrachloroethane, ug/kg dw	<110	
1,1,1,2-Tetrachloroethane, ug/kg dw	<110	
Tetrachloroethylene, ug/kg dw	<110	
Toluene, ug/kg dw	930	
1,1,1-Trichloroethane, ug/kg dw	<110	
1,1,2-Trichloroethane, ug/kg dw	<110	
Trichloroethene, ug/kg dw	<110	
Trichlorofluoromethane, ug/kg dw	<110	
Trichloropropane, ug/kg dw	<110	
Vinyl Chloride, ug/kg dw	<110	
Xylenes, ug/kg dw	14000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		
Semivolatile Organics (8270)		
1,3-Dichlorobenzene, ug/kg dw	<34000	
1,4-Dichlorobenzene, ug/kg dw	<34000	
Hexachloroethane, ug/kg dw	<34000	
bis(2-Chloroethyl) ether, ug/kg dw	<34000	
1,2-Dichlorobenzene, ug/kg dw	<34000	
Bis(2-chloroisopropyl)ether, ug/kg dw	<34000	
N-Nitrosodi-N-Propylamine, ug/kg dw	<34000	
Nitrobenzene, ug/kg dw	<34000	
Hexachlorobutadiene, ug/kg dw	<34000	
1,2,4-Trichlorobenzene, ug/kg dw	<34000	
Isophorone, ug/kg dw	<34000	
Naphthalene, ug/kg dw	<34000	
bis(2-Chloroethoxy) methane, ug/kg dw	<34000	
Hexachlorocyclopentadiene, ug/kg dw	<34000	
2-Chloronaphthalene, ug/kg dw	<34000	
Acenaphthylene, ug/kg dw	<34000	
Acenaphthene, ug/kg dw	<34000	
Dimethylphthalate, ug/kg dw	<34000	
2,6-Dinitrotoluene, ug/kg dw	<34000	
Fluorene, ug/kg dw	<34000	
4-Chlorophenyl-phenyl ether, ug/kg dw	<34000	
2,4-Dinitrotoluene, ug/kg dw	<34000	
Diethyl Phthalate, ug/kg dw	<34000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		11075-1
N-Nitrosodiphenylamine, ug/kg dw	<34000	
Hexachlorobenzene, ug/kg dw	<34000	
gamma-BHC, ug/kg dw	<34000	
4-Bromophenyl-phenyl-ether, ug/kg dw	<34000	
delta-BHC, ug/kg dw	<34000	
Phenanthrene, ug/kg dw	<34000	
Anthracene, ug/kg dw	<34000	
beta-BHC, ug/kg dw	<34000	
Heptachlor, ug/kg dw	<34000	
alpha-BHC, ug/kg dw	<34000	
Aldrin, ug/kg dw	<34000	
Dibutyl phthalate, ug/kg dw	<34000	
Heptachlor epoxide, ug/kg dw	<34000	
Endosulfan I, ug/kg dw	<34000	
Fluoranthene, ug/kg dw	<34000	
Dieldrin, ug/kg dw	<34000	
4,4'-DDE, ug/kg dw	<34000	
Pyrene, ug/kg dw	<34000	
Endrin, ug/kg dw	<34000	
Endosulfan II, ug/kg dw	<34000	
4,4'-DDD, ug/kg dw	<34000	
Benzidine, ug/kg dw	<270000	
4,4'-DDT, ug/kg dw	<34000	
Endosulfan sulfate, ug/kg dw	<34000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		11075-1
Endrin Aldehyde, ug/kg dw	<34000	
Butylbenzylphthalate, ug/kg dw	<34000	
bis(2-Ethylhexyl) phthalate, ug/kg dw	<34000	
Chrysene, ug/kg dw	<34000	
Benzo(a)Anthracene, ug/kg dw	<34000	
3,3'-Dichlorobenzidine, ug/kg dw	<68000	
Di-n-octylphthalate, ug/kg dw	<34000	
Benzo(b)fluoranthene, ug/kg dw	<34000	
Benzo (k) Fluoranthene, ug/kg dw	<34000	
Benzo(a)pyrene, ug/kg dw	<34000	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<34000	
Dibenz (a,h)anthracene, ug/kg dw	<34000	
Benzo(g,h,i)perylene, ug/kg dw	<34000	
N-Nitrosodimethylamine, ug/kg dw	<34000	
Chlordane, ug/kg dw	87000	
Toxaphene, ug/kg dw	<680000	
Aroclor-1016, ug/kg dw	<340000	
Aroclor-1221, ug/kg dw	<340000	
Aroclor-1232, ug/kg dw	<340000	
Aroclor-1242, ug/kg dw	<340000	
Aroclor-1248, ug/kg dw	<340000	
Aroclor-1254, ug/kg dw	<340000	
Aroclor-1260, ug/kg dw	<340000	
2-Chlorophenol, ug/kg dw	<34000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		11075-1
2-Nitrophenol, ug/kg dw		<34000
Phenol, ug/kg dw		<34000
2,4-Dimethylphenol, ug/kg dw		<34000
2,4-Dichlorophenol, ug/kg dw		<34000
2,4,6-Trichlorophenol, ug/kg dw		<34000
4-Chloro-3-methylphenol, ug/kg dw		<34000
2,4-Dinitrophenol, ug/kg dw		<170000
2-Methyl-4,6-dinitrophenol, ug/kg dw		<170000
Pentachlorophenol, ug/kg dw		<170000
4-Nitrophenol, ug/kg dw		<170000
Benzyl alcohol, ug/kg dw		<34000
2-Methylphenol (o-cresol), ug/kg dw		<34000
4-Methylphenol (p-cresol), ug/kg dw		<34000
Benzoic acid, ug/kg dw		<170000
4-Chloroaniline, ug/kg dw		<34000
2-Methylnaphthalene, ug/kg dw		<34000
2,4,5-Trichlorophenol, ug/kg dw		<34000
2-Nitroaniline, ug/kg dw		<170000
3-Nitroaniline, ug/kg dw		<170000
Dibenzofuran, ug/kg dw		<34000
4-Nitroaniline, ug/kg dw		<170000

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
PARAMETER		11075-1
Organophosphorus Pesticides		
Azinphos methyl, ug/kg dw	<190	
Bolstar (Sulprofos), ug/kg dw	<9.6	
Chlorpyrifos, ug/kg dw	<1.9	
Coumaphos, ug/kg dw	<96	
Demeton-O, ug/kg dw	<19	
Demeton-S, ug/kg dw	<19	
Diazinon, ug/kg dw	<9.6	
Dichlorvos, ug/kg dw	<19	
Disulfoton, ug/kg dw	<9.6	
Ethoprop, ug/kg dw	<1.9	
Fensulfothion, ug/kg dw	<96	
Fenthion, ug/kg dw	<1.9	
Merphos, ug/kg dw	<9.6	
Mevinphos, ug/kg dw	<1.9	
Naled, ug/kg dw	<19	
Methyl Parathion, ug/kg dw	<9.6	
Phorate, ug/kg dw	<1.9	
Ronnel, ug/kg dw	<1.9	
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.6	
Tokuthion (Prothiofos), ug/kg dw	<9.6	
Trichloronate, ug/kg dw	<96	
Additional Compounds:		
Ethion, ug/kg dw	75	



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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-1	CO-SB-26-01	Client
<hr/>		
PARAMETER	11075-1	
<hr/>		
Chlorinated Herbicides (8150)		
2,4-D, ug/kg dw	<650*	
2,4-DB, ug/kg dw	<650*	
2,4,5-T, ug/kg dw	<390*	
2,4,5-TP Silvex, ug/kg dw	<130*	
Dalapon, ug/kg dw	<13000*	
Dicamba, ug/kg dw	<6500*	
Dichlorprop, ug/kg dw	<650*	
Dinoseb, ug/kg dw	<650*	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<13000*	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<13000*	
<hr/>		

\* =Increased Detection limits do to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11075-2	11075-3	11075-4	11075-5	11075-6
Semivolatile Organics (8270)						
1,3-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000	
1,4-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000	
Hexachloroethane, ug/kg dw	<350	<360	<350	<370	<35000	
bis(2-Chloroethyl) ether, ug/kg dw	<350	<360	<350	<370	<35000	
1,2-Dichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000	
Bis(2-chloroisopropyl)ether , ug/kg dw	<350	<360	<350	<370	<35000	
N-Nitrosodi-N-Propylamine, ug/kg dw	<350	<360	<350	<370	<35000	
Nitrobenzene, ug/kg dw	<350	<360	<350	<370	<35000	
Hexachlorobutadiene, ug/kg dw	<350	<360	<350	<370	<35000	
1,2,4-Trichlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000	
Isophorone, ug/kg dw	<350	<360	<350	<370	<35000	
Naphthalene, ug/kg dw	<350	<360	<350	<370	<35000	
bis(2-Chloroethoxy) methane, ug/kg dw	<350	<360	<350	<370	<35000	
Hexachlorocyclopentadiene, ug/kg dw	<350	<360	<350	<370	<35000	
2-Chloronaphthalene, ug/kg dw	<350	<360	<350	<370	<35000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11075-2	CO-SB-12-01	Client
11075-3	CO-SB-13-01	
11075-4	CO-SB-14-01	
11075-5	CO-SB-15-01	
11075-6	CO-SB-16-01	

PARAMETER	11075-2	11075-3	11075-4	11075-5	11075-6
Acenaphthylene, ug/kg dw	<350	<360	<350	<370	<35000
Acenaphthene, ug/kg dw	<350	<360	<350	<370	<35000
Dimethylphthalate, ug/kg dw	<350	<360	<350	<370	<35000
2,6-Dinitrotoluene, ug/kg dw	<350	<360	<350	<370	<35000
Fluorene, ug/kg dw	<350	<360	<350	<370	<35000
4-Chlorophenyl-phenyl ether, ug/kg dw	<350	<360	<350	<370	<35000
2,4-Dinitrotoluene, ug/kg dw	<350	<360	<350	<370	<35000
Diethyl Phthalate, ug/kg dw	<350	<360	<350	<370	<35000
N-Nitrosodiphenylamine, ug/kg dw	<350	<360	<350	<370	<35000
Hexachlorobenzene, ug/kg dw	<350	<360	<350	<370	<35000
gamma-BHC, ug/kg dw	<350	<360	<350	<370	<35000
4-Bromophenyl-phenyl-ether, ug/kg dw	<350	<360	<350	<370	<35000
delta-BHC, ug/kg dw	<350	<360	<350	<370	<35000
Phenanthrene, ug/kg dw	<350	<360	<350	<370	<35000
Anthracene, ug/kg dw	<350	<360	<350	<370	<35000
beta-BHC, ug/kg dw	<350	<360	<350	<370	<35000
Heptachlor, ug/kg dw	<350	<360	<350	460	<35000
alpha-BHC, ug/kg dw	<350	<360	<350	<370	<35000

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
11075-2	CO-SB-12-01				Client
11075-3	CO-SB-13-01				
11075-4	CO-SB-14-01				
11075-5	CO-SB-15-01				
11075-6	CO-SB-16-01				
PARAMETER		11075-2	11075-3	11075-4	11075-5
Aldrin, ug/kg dw		<350	<360	<350	<370
Dibutyl phthalate, ug/kg dw		<350	<360	<350	<370
Heptachlor epoxide, ug/kg dw		<350	<360	<350	<370
Endosulfan I, ug/kg dw		<350	<360	<350	<370
Fluoranthene, ug/kg dw		<350	<360	<350	<370
Dieldrin, ug/kg dw		<350	<360	<350	1200
4,4'-DDE, ug/kg dw		<350	<360	<350	1100
Pyrene, ug/kg dw		<350	<360	<350	<370
Endrin, ug/kg dw		<350	<360	<350	1200
Endosulfan II, ug/kg dw		<350	<360	<350	<370
4,4'-DDD, ug/kg dw		<350	<360	<350	<370
Benzidine, ug/kg dw		<2800	<2900	<2800	<3000
4,4'-DDT, ug/kg dw		<350	410	<350	4200
Endosulfan sulfate, ug/kg dw		<350	<360	<350	<370
Endrin Aldehyde, ug/kg dw		<350	<360	<350	<370
Butylbenzylphthalate, ug/kg dw		<350	<360	<350	<370
bis(2-Ethylhexyl) phthalate, ug/kg dw		<350	<360	<350	<370
Chrysene, ug/kg dw		<350	<360	<350	<370
Benzo(a)Anthracene, ug/kg dw		<350	<360	<350	<370

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11075-2	CO-SB-12-01					Client
11075-3	CO-SB-13-01					
11075-4	CO-SB-14-01					
11075-5	CO-SB-15-01					
11075-6	CO-SB-16-01					
PARAMETER		11075-2	11075-3	11075-4	11075-5	11075-6
3,3'-Dichlorobenzidine, ug/kg dw	<700	<720	<700	<1900	<70000	
Di-n-octylphthalate, ug/kg dw	<350	<360	<350	<370	<35000	
Benzo(b)fluoranthene, ug/kg dw	<350	<360	<350	<370	<35000	
Benzo (k) Fluoranthene, ug/kg dw	<350	<360	<350	<370	<35000	
Benzo(a)pyrene, ug/kg dw	<350	<360	<350	<370	<35000	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<350	<360	<350	<370	<35000	
Dibenz (a,h)anthracene, ug/kg dw	<350	<360	<350	<370	<35000	
Benzo(g,h,i)perylene, ug/kg dw	<350	<360	<350	<370	<35000	
N-Nitrosodimethylamine, ug/kg dw	<350	<360	<350	<370	<35000	
Chlordane, ug/kg dw	4600	73000	<700	<740	1100000	
Toxaphene, ug/kg dw	<70000*	<72000*	<7000	<74000*	<700000	
Aroclor-1016, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1221, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1232, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1242, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1248, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1254, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
Aroclor-1260, ug/kg dw	<3500	<3600	<3500	<3700	<350000	
2-Chlorophenol, ug/kg dw	<350	<360	<350	<370	<35000	
2-Nitrophenol, ug/kg dw	<350	<360	<350	<370	<35000	

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11075-3	CO-SB-13-01				
11075-4	CO-SB-14-01				
11075-5	CO-SB-15-01				
11075-6	CO-SB-16-01				
PARAMETER		11075-2	11075-3	11075-4	11075-5
Phenol, ug/kg dw		<350	<360	<350	<370
2,4-Dimethylphenol, ug/kg dw		<350	<360	<350	<370
2,4-Dichlorophenol, ug/kg dw		<350	<360	<350	<370
2,4,6-Trichlorophenol, ug/kg dw		<350	<360	<350	<370
4-Chloro-3-methylphenol, ug/kg dw		<350	<360	<350	<370
2,4-Dinitrophenol, ug/kg dw		<1800	<1800	<1800	<1900
2-Methyl-4,6-dinitrophenol, ug/kg dw		<1800	<1800	<1800	<1900
Pentachlorophenol, ug/kg dw		<1800	<1800	<1800	<180000
4-Nitrophenol, ug/kg dw		<1800	<1800	<1800	<180000
Benzyl alcohol, ug/kg dw		<350	<360	<350	<370
2-Methylphenol (o-cresol), ug/kg dw		<350	<360	<350	<370
4-Methylphenol (p-cresol), ug/kg dw		<350	<360	<350	<370
Benzoic acid, ug/kg dw		<1800	<1800	<1800	<1900
4-Chloroaniline, ug/kg dw		<350	<360	<350	<370
2-Methylnaphthalene, ug/kg dw		<350	<360	<350	<370
2,4,5-Trichlorophenol, ug/kg dw		<350	<360	<350	<370
2-Nitroaniline, ug/kg dw		<1800	<1800	<1800	<1900
3-Nitroaniline, ug/kg dw		<1800	<1800	<1800	<1900
Dibenzofuran, ug/kg dw		<350	<360	<350	<370
4-Nitroaniline, ug/kg dw		<1800	<1800	<1800	<1900

**SL SAVANNAH LABORATORIES**  
**& ENVIRONMENTAL SERVICES, INC.**

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11075-2	11075-3	11075-4	11075-5	11075-6
Organophosphorus Pesticides						
Azinphos methyl, ug/kg dw	<200	<220	<210	<220	<200	<200
Bolstar (Sulprofos), ug/kg dw	<10	<11	<11	<11	<10	<10
Chlorpyrifos, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Coumaphos, ug/kg dw	<100	<110	<110	<110	<100	<100
Demeton-O, ug/kg dw	<20	<22	<21	<22	<20	<20
Demeton-S, ug/kg dw	<20	<22	<21	<22	<20	<20
Diazinon, ug/kg dw	<10	<11	<11	<11	<10	<10
Dichlorvos, ug/kg dw	<20	<22	<21	<22	<20	<20
Disulfoton, ug/kg dw	<10	<11	<11	<11	<10	<10
Ethoprop, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Fensulfothion, ug/kg dw	<100	<110	<110	<110	<100	<100
Fenthion, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Merphos, ug/kg dw	<10	<11	<11	<11	<10	<10
Mevinphos, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Naled, ug/kg dw	<20	<22	<21	<22	<20	<20
Methyl Parathion, ug/kg dw	<10	<11	<11	<11	<10	<10
Phorate, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Ronnel, ug/kg dw	<2.0	<2.2	<2.2	<2.2	<2.0	<2.0
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<11	<11	<11	<10	<10

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
11075-2	CO-SB-12-01					Client
11075-3	CO-SB-13-01					
11075-4	CO-SB-14-01					
11075-5	CO-SB-15-01					
11075-6	CO-SB-16-01					
PARAMETER		11075-2	11075-3	11075-4	11075-5	11075-6
Tokuthion (Prothiofos), ug/kg dw	<10	<11	<11	<11	<11	<10
Trichloronate, ug/kg dw	<100	<110	<110	<110	<110	<100
Additional Compounds:						
Ethion, ug/kg dw	<10	<11	<11	<11	<11	190000
<b>Chlorinated Herbicides (8150)</b>						
2,4-D, ug/kg dw	<290*	<100	<110	<110	<110	<110
2,4-DB, ug/kg dw	<290*	<100	<110	<110	<110	<110
2,4,5-T, ug/kg dw	<180*	<60	<68	<68	<68	<68
2,4,5-TP Silvex, ug/kg dw	<57*	<20	<23	<23	<23	<23
Dalapon, ug/kg dw	<5800*	<2000	<2300	<2300	<2300	<2300
Dicamba, ug/kg dw	<2900*	<1000	<1100	<1100	<1100	<1100
Dichlorprop, ug/kg dw	<290*	<100	<110	<110	<110	<110
Dinoseb, ug/kg dw	<290*	<100	<110	<110	<110	<110
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<5800*	<2000	<2300	<2300	<2300	<2300
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<5800*	<2000	<2300	<2300	<2300	<2300

\* = Increased detection limits due to matrix interference.

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PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
<b>Semivolatile Organics (8270)</b>						
1,3-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330	
1,4-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Hexachloroethane, ug/kg dw	<36000	<35000	<35000	<360	<330	
bis(2-Chloroethyl) ether, ug/kg dw	<36000	<35000	<35000	<360	<330	
1,2-Dichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Bis(2-chloroisopropyl)ether , ug/kg dw	<36000	<35000	<35000	<360	<330	
N-Nitrosodi-N-Propylamine, ug/kg dw	<36000	<35000	<35000	<360	<330	
Nitrobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Hexachlorobutadiene, ug/kg dw	<36000	<35000	<35000	<360	<330	
1,2,4-Trichlorobenzene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Isophorone, ug/kg dw	<36000	<35000	<35000	<360	<330	
Naphthalene, ug/kg dw	<36000	<35000	<35000	<360	<330	
bis(2-Chloroethoxy) methane, ug/kg dw	<36000	<35000	<35000	<360	<330	
Hexachlorocyclopentadiene, ug/kg dw	<36000	<35000	<35000	<360	<330	

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11075-8	CO-SB-25-01					
11075-9	CO-SB-26-02					
11075-10	CO-SB-28-01					
11075-11	CO-SB-30-01					
PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
2-Chloronaphthalene, ug/kg dw		<36000	<35000	<35000	<360	<330
Acenaphthylene, ug/kg dw		<36000	<35000	<35000	<360	<330
Acenaphthene, ug/kg dw		<36000	<35000	<35000	<360	<330
Dimethylphthalate, ug/kg dw		<36000	<35000	<35000	<360	<330
2,6-Dinitrotoluene, ug/kg dw		<36000	<35000	<35000	<360	<330
Fluorene, ug/kg dw		<36000	<35000	<35000	<360	<330
4-Chlorophenyl-phenyl ether, ug/kg dw		<36000	<35000	<35000	<360	<330
2,4-Dinitrotoluene, ug/kg dw		<36000	<35000	<35000	<360	<330
Diethyl Phthalate, ug/kg dw		<36000	<35000	<35000	<360	<330
N-Nitrosodiphenylamine, ug/kg dw		<36000	<35000	<35000	<360	<330
Hexachlorobenzene, ug/kg dw		<36000	<35000	<35000	<360	<330
gamma-BHC, ug/kg dw		<36000	<35000	<35000	<360	<330
4-Bromophenyl-phenyl-ether, ug/kg dw		<36000	<35000	<35000	<360	<330
delta-BHC, ug/kg dw		<36000	<35000	<35000	<360	<330
Phenanthrene, ug/kg dw		<36000	<35000	<35000	<360	<330
Anthracene, ug/kg dw		<36000	<35000	<35000	<360	<330
beta-BHC, ug/kg dw		<36000	<35000	<35000	<360	<330
Heptachl., ug/kg dw		<36000	<35000	<35000	<360	<330

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11075-8	CO-SB-25-01					
11075-9	CO-SB-26-02					
11075-10	CO-SB-28-01					
11075-11	CO-SB-30-01					
PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
alpha-BHC, ug/kg dw		<36000	<35000	<35000	<360	<330
Aldrin, ug/kg dw		<36000	<35000	<35000	<360	<330
Dibutyl phthalate, ug/kg dw		<36000	<35000	<35000	<360	<330
Heptachlor epoxide, ug/kg dw		<36000	<35000	<35000	<360	<330
Endosulfan I, ug/kg dw		<36000	<35000	<35000	<360	<330
Fluoranthene, ug/kg dw		<36000	<35000	<35000	<360	<330
Dieldrin, ug/kg dw		<36000	<35000	<35000	760	<330
4,4'-DDE, ug/kg dw		<36000	<35000	<35000	390	<330
Pyrene, ug/kg dw		<36000	<35000	<35000	<360	<330
Endrin, ug/kg dw		<36000	<35000	<35000	<360	<330
Endosulfan II, ug/kg dw		<36000	<35000	<35000	<360	<330
4,4'-DDD, ug/kg dw		<36000	<35000	51000	<360	<330
Benzidine, ug/kg dw		<290000	<280000	<280000	<2900	<2700
4,4'-DDT, ug/kg dw		<36000	<35000	<35000	980	<330
Endosulfan sulfate, ug/kg dw		<36000	<35000	<35000	<360	<330
Endrin Aldehyde, ug/kg dw		<36000	<35000	<35000	<360	<330
Butylbenzylphthalate, ug/kg dw		<36000	<35000	<35000	<360	<330
bis(2-Ethylhexyl) phthalate, ug/kg dw		<36000	<35000	<35000	<360	<330
Chrysene, ug/kg dw		<36000	<35000	<35000	<360	<330

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11075-8	CO-SB-25-01					
11075-9	CO-SB-26-02					
11075-10	CO-SB-28-01					
11075-11	CO-SB-30-01					
PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
Benzo(a)Anthracene, ug/kg dw	<36000	<35000	<35000	<360	<330	
3,3'-Dichlorobenzidine, ug/kg dw	<72000	<70000	<70000	<720	<670	
Di-n-octylphthalate, ug/kg dw	<36000	<35000	<35000	<360	<330	
Benzo(b)fluoranthene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Benzo (k) Fluoranthene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Benzo(a)pyrene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Dibenz (a,h)anthracene, ug/kg dw	<36000	<35000	<35000	<360	<330	
Benzo(g,h,i)perylene, ug/kg dw	<36000	<35000	<35000	<360	<330	
N-Nitrosodimethylamine, ug/kg dw	<36000	<35000	<35000	<360	<330	
Chlordane, ug/kg dw	760000	100000	<70000	13000	<670	
Toxaphene, ug/kg dw	<720000	<700000	<700000	<72000*	<6700	
Aroclor-1016, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1221, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1232, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1242, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1248, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1254, ug/kg dw	<360000	<350000	<350000	<3600	<3300	
Aroclor-1260, ug/kg dw	<360000	<350000	<350000	<3600	<3300	

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11075-8	CO-SB-25-01				
11075-9	CO-SB-26-02				
11075-10	CO-SB-28-01				
11075-11	CO-SB-30-01				
PARAMETER		11075-7	11075-8	11075-9	11075-10
2-Chlorophenol, ug/kg dw		<36000	<35000	<35000	<360
2-Nitrophenol, ug/kg dw		<36000	<35000	<35000	<360
Phenol, ug/kg dw		<36000	<35000	<35000	<360
2,4-Dimethylphenol, ug/kg dw		<36000	<35000	<35000	<360
2,4-Dichlorophenol, ug/kg dw		<36000	<35000	<35000	<360
2,4,6-Trichlorophenol, ug/kg dw		<36000	<35000	<35000	<360
4-Chloro-3-methylphenol, ug/kg dw		<36000	<35000	<35000	<360
2,4-Dinitrophenol, ug/kg dw		<180000	<180000	<180000	<1800
2-Methyl-4,6-dinitrophenol, ug/kg dw		<180000	<180000	<180000	<1800
Pentachlorophenol, ug/kg dw		<180000	<180000	<180000	<1800
4-Nitrophenol, ug/kg dw		<180000	<180000	<180000	<1800
Benzyl alcohol, ug/kg dw		<36000	<35000	<35000	<360
2-Methylphenol (o-cresol), ug/kg dw		<36000	<35000	<35000	<360
4-Methylphenol (p-cresol), ug/kg dw		<36000	<35000	<35000	<360
Benzoic acid, ug/kg dw		<180000	<180000	<180000	<1800
4-Chloraniline, ug/kg dw		<36000	<35000	<35000	<360

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11075-8	CO-SB-25-01	
11075-9	CO-SB-26-02	
11075-10	CO-SB-28-01	
11075-11	CO-SB-30-01	

PARAMETER	11075-7	11075-8	11075-9	11075-10	11075-11
2-Methylnaphthalene, ug/kg dw	<36000	<35000	<35000	<360	<330
2,4,5-Trichlorophenol, ug/kg dw	<36000	<35000	<35000	<360	<330
2-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700
3-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700
Dibenzofuran, ug/kg dw	<36000	<35000	<35000	<360	<330
4-Nitroaniline, ug/kg dw	<180000	<180000	<180000	<1800	<1700

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
	Organophosphorus Pesticides					
	Azinphos methyl, ug/kg dw	<200	<180	<200	<210	<190
	Bolstar (Sulprofos), ug/kg dw	<10	<8.8	<10	<10	<9.7
	Chlorpyrifos, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Coumaphos, ug/kg dw	<100	<88	<100	<100	<97
	Demeton-O, ug/kg dw	<20	<18	<20	<21	<20
	Demeton-S, ug/kg dw	420	<18	<20	<21	<20
	Diazinon, ug/kg dw	<10	<8.8	<10	<10	<9.7
	Dichlorvos, ug/kg dw	<20	<18	<20	<21	<20
	Disulfoton, ug/kg dw	<10	<8.8	<10	<10	<9.7
	Ethoprop, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Fensulfothion, ug/kg dw	<100	<88	<100	<100	<97
	Fenthion, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Merphos, ug/kg dw	<10	<8.8	<100	<10	<9.7
	Mevinphos, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Naled, ug/kg dw	<20	<18	<20	<21	<20
	Methyl Parathion, ug/kg dw	<10	<8.8	<10	<10	<9.7
	Phorate, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Ronnel, ug/kg dw	<2.0	<1.8	<2.0	<2.0	<2.0
	Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<8.8	<10	<10	<9.7

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11075-7	11075-8	11075-9	11075-10	11075-11
11075-7	CO-SB-24-01					Client
11075-8	CO-SB-25-01					
11075-9	CO-SB-26-02					
11075-10	CO-SB-28-01					
11075-11	CO-SB-30-01					
<hr/>						
Tokuthion (Prothiofos), ug/kg dw	<10	<8.8	<10	<10	<9.7	
Trichloronate, ug/kg dw	<100	<88	<100	<100	<97	
<hr/>						
Additional Compounds:						
Ethion, ug/kg dw	54000	31	52	<10	<9.7	
<hr/>						
Chlorinated Herbicides (8150)						
2,4-D, ug/kg dw	<1100*	<100	<550*	<1100*	<100	
2,4-DB, ug/kg dw	<1100*	<100	<550*	<1100*	<100	
2,4,5-T, ug/kg dw	<660*	<60	<330*	<660*	<60	
2,4,5-TP Silvex, ug/kg dw	<220*	<20	<110*	<220*	<20	
Dalapon, ug/kg dw	<22000*	<2000	<11000*	<22000*	<2000	
Dicamba, ug/kg dw	<1000*	<1000	<5500*	<11000*	<1000	
Dichlorprop, ug/kg dw	<1100*	<100	<550*	<1100*	<100	
Dinoseb, ug/kg dw	<1100*	<100	<550*	<1100*	<100	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<22000*	<2000	<1000*	<22000*	<2000	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<22000*	<2000	<1000*	<22000*	<2000	
<hr/>						

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Volatile Organics			
Benzyl chloride, ug/kg dw		<5.4	<110
bis(2-Chloroethoxy) methane, ug/kg dw		<5.4	<110
Bis(2-chloroisopropyl)ether, ug/kg dw		<5.4	<110
Bromobenzene, ug/kg dw		<5.4	<110
Bromodichloromethane, ug/kg dw		<5.4	<110
Benzene, ug/kg dw		<5.4	<110
Bromoform, ug/kg dw		<5.4	<110
Bromomethane, ug/kg dw		<5.4	<110
Carbon Tetrachloride, ug/kg dw		<5.4	<110
Chloroacetaldehyde, ug/kg dw		<5.4	<110
Chlorobenzene, ug/kg dw		140	<110
Chloroethane, ug/kg dw		<5.4	<110
Chloroform, ug/kg dw		<5.4	<110
1-Chlorohexane, ug/kg dw		<5.4	<110
2-Chloroethylvinyl Ether, ug/kg dw		<5.4	<110
Chloromethane, ug/kg dw		<5.4	<110
Chloromethyl methyl ether, ug/kg dw		<5.4	<110
Chlorotoluene, ug/kg dw		<5.4	<110
Dibromochloromethane, ug/kg dw		<5.4	<110
Dibromomethane, ug/kg dw		<5.4	<110
1,2-Dichlorobenzene, ug/kg dw		<5.4	<110
1,3-Dichlorobenzene, ug/kg dw		15	<110

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PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
1,4-Dichlorobenzene, ug/kg dw		200	<110
Dichlorodifluoromethane, ug/kg dw		<5.4	<110
1,1-Dichloroethane, ug/kg dw		<5.4	<110
1,2-Dichloroethane, ug/kg dw		<5.4	<110
1,1-Dichloroethene, ug/kg dw		<5.4	<110
1,2-Dichloropropane, ug/kg dw		<5.4	<110
1,3-Dichloropropylene, ug/kg dw		<5.4	<110
Ethylbenzene, ug/kg dw		51	390
Methylene Chloride, ug/kg dw		<5.4	<110
1,1,2,2-Tetrachloroethane, ug/kg dw		<5.4	<110
1,1,1,2-Tetrachloroethane, ug/kg dw		<5.4	<110
Tetrachloroethylene, ug/kg dw		<5.4	<110
Toluene, ug/kg dw		81	<110
1,1,1-Trichloroethane, ug/kg dw		<5.4	<110
1,1,2-Trichloroethane, ug/kg dw		<5.4	<110
Trichloroethene, ug/kg dw		<5.4	<110
Trichlorofluoromethane, ug/kg dw		<5.4	<110
Trichloropropane, ug/kg dw		<5.4	<110
Vinyl Chloride, ug/kg dw		<5.4	<110
Xylenes, ug/kg dw		130	3300

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Semivolatile Organics (8270)			
1,3-Dichlorobenzene, ug/kg dw	<360	<6900*	
1,4-Dichlorobenzene, ug/kg dw	<360	<6900*	
Hexachloroethane, ug/kg dw	<360	<6900*	
bis(2-Chloroethyl) ether, ug/kg dw	<360	<6900*	
1,2-Dichlorobenzene, ug/kg dw	<360	<6900*	
Bis(2-chloroisopropyl)ether, ug/kg dw	<360	<6900*	
N-Nitrosodi-N-Propylamine, ug/kg dw	<360	<6900*	
Nitrobenzene, ug/kg dw	<360	<6900*	
Hexachlorobutadiene, ug/kg dw	<360	<6900*	
1,2,4-Trichlorobenzene, ug/kg dw	<360	<6900*	
Isophorone, ug/kg dw	<360	<6900*	
Naphthalene, ug/kg dw	<360	<6900*	
bis(2-Chloroethoxy) methane, ug/kg dw	<360	<6900*	
Hexachlorocyclopentadiene, ug/kg dw	<360	<6900*	
2-Chloronaphthalene, ug/kg dw	<360	<6900*	
Acenaphthylene, ug/kg dw	<360	<6900*	
Acenaphthene, ug/kg dw	<360	<6900*	
Dimethylphthalate, ug/kg dw	<360	<6900*	
2,6-Dinitrotoluene, ug/kg dw	<360	<6900*	
Fluorene, ug/kg dw	<360	<6900*	
4-Chlorophenyl-phenyl ether, ug/kg dw	<360	<6900*	
2,4-Dinitrotoluene, ug/kg dw	<360	<6900*	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Diethyl Phthalate, ug/kg dw		<360	<6900*
N-Nitrosodiphenylamine, ug/kg dw		<360	<6900*
Hexachlorobenzene, ug/kg dw		<360	<6900*
gamma-BHC, ug/kg dw		<360	<6900*
4-Bromophenyl-phenyl-ether, ug/kg dw		<360	<6900*
delta-BHC, ug/kg dw		<360	<6900*
Phenanthrene, ug/kg dw		<360	<6900*
Anthracene, ug/kg dw		<360	<6900*
beta-BHC, ug/kg dw		<360	<6900*
Heptachlor, ug/kg dw		<360	<6900*
alpha-BHC, ug/kg dw		<360	<6900*
Aldrin, ug/kg dw		<360	<6900*
Dibutyl phthalate, ug/kg dw		<360	<6900*
Heptachlor epoxide, ug/kg dw		<360	<6900*
Endosulfan I, ug/kg dw		<360	<6900*
Fluoranthene, ug/kg dw		<360	<6900*
Dieldrin, ug/kg dw		<360	<6900*
4,4'-DDE, ug/kg dw		<360	<6900*
Pyrene, ug/kg dw		<360	<6900*
Endrin, ug/kg dw		<360	<6900*
Endosulfan II, ug/kg dw		<360	<6900*
4,4'-DDD, ug/kg dw		<360	<6900*
Benzidine, ug/kg dw		<2900	<55000*

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11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
PARAMETER		11075-12	11075-13
4,4'-DDT, ug/kg dw		<360	<6900*
Endosulfan sulfate, ug/kg dw		<360	<6900*
Endrin Aldehyde, ug/kg dw		<360	<6900*
Butylbenzylphthalate, ug/kg dw		<360	<6900*
bis(2-Ethylhexyl) phthalate, ug/kg dw		<360	<6900*
Chrysene, ug/kg dw		<360	<6900*
Benzo(a)Anthracene, ug/kg dw		<360	<6900*
3,3'-Dichlorobenzidine, ug/kg dw		<720	<14000*
Di-n-octylphthalate, ug/kg dw		<360	<6900*
Benzo(b)fluoranthene, ug/kg dw		<360	<6900*
Benzo (k) Fluoranthene, ug/kg dw		<360	<6900*
Benzo(a)pyrene, ug/kg dw		<360	<6900*
Indeno (1,2,3-cd)pyrene, ug/kg dw		<360	<6900*
Dibenz (a,h)anthracene, ug/kg dw		<360	<6900*
Benzo(g,h,i)perylene, ug/kg dw		<360	<6900*
N-Nitrosodimethylamine, ug/kg dw		<360	<6900*
Chlordane, ug/kg dw		1300	<14000*
Toxaphene, ug/kg dw		<7200	<140000*
Aroclor-1016, ug/kg dw		<360	<69000*
Aroclor-1221, ug/kg dw		<360	<69000*
Aroclor-1232, ug/kg dw		<360	<69000*
Aroclor-1242, ug/kg dw		<360	<69000*
Aroclor-1248, ug/kg dw		<360	<69000*

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PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Aroclor-1254, ug/kg dw		<360	<69000*
Aroclor-1260, ug/kg dw		<360	<69000*
2-Chlorophenol, ug/kg dw		<360	<6900*
2-Nitrophenol, ug/kg dw		<360	<6900*
Phenol, ug/kg dw		<360	<6900*
2,4-Dimethylphenol, ug/kg dw		<360	<6900*
2,4-Dichlorophenol, ug/kg dw		<360	<6900*
2,4,6-Trichlorophenol, ug/kg dw		<360	<6900*
4-Chloro-3-methylphenol, ug/kg dw		<360	<6900*
2,4-Dinitrophenol, ug/kg dw		<1800	<34000*
2-Methyl-4,6-dinitrophenol, ug/kg dw		<1800	<34000*
Pentachlorophenol, ug/kg dw		<1800	<34000*
4-Nitrophenol, ug/kg dw		<1800	<34000*
Benzyl alcohol, ug/kg dw		<360	<6900*
2-Methylphenol (o-cresol), ug/kg dw		<360	<6900*
4-Methylphenol (p-cresol), ug/kg dw		<360	<6900*
Benzoic acid, ug/kg dw		<1800	<34000*
4-Chloroaniline, ug/kg dw		<360	<6900*
2-Methylnaphthalene, ug/kg dw		<360	<6900*
2,4,5-Trichlorophenol, ug/kg dw		<360	<6900*
2-Nitroaniline, ug/kg dw		<1800	<34000*
3-Nitroaniline, ug/kg dw		<1800	<34000*
Dibenzofuran, ug/kg dw		<360	<6900*
4-Nitroaniline, ug/kg dw		<1800	<34000*

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PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Organophosphorus Pesticides			
Azinphos methyl, ug/kg dw		<190	<210
Bolstar (Sulprofos), ug/kg dw		<9.7	<11
Chlorpyrifos, ug/kg dw		<1.9	<2.1
Coumaphos, ug/kg dw		<97	<110
Demeton-O, ug/kg dw		<19	<21
Demeton-S, ug/kg dw		<19	<21
Diazinon, ug/kg dw		<9.7	<11
Dichlorvos, ug/kg dw		<19	<21
Disulfoton, ug/kg dw		<9.7	<11
Ethoprop, ug/kg dw		<1.9	<2.1
Fensulfothion, ug/kg dw		<97	<110
Fenthion, ug/kg dw		<1.9	<2.1
Merphos, ug/kg dw		<9.7	<11
Mevinphos, ug/kg dw		<1.9	<2.1
Naled, ug/kg dw		<19	<21
Methyl Parathion, ug/kg dw		<9.7	<11
Phorate, ug/kg dw		<1.9	<2.1
Ronnel, ug/kg dw		<1.9	<2.1
Stirophos (Tetrachlorvinphos), ug/kg dw		<9.7	<11
Tokuthion (Prothiofos), ug/kg dw		<9.7	<11
Trichloronate, ug/kg dw		<97	<110
Additional Compounds:			
Ethion, ug/kg dw		400	28

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-12	11075-13
11075-12	CO-SB-10-01		Client
11075-13	CO-SB-11-01		
Chlorinated Herbicides (8150)			
2,4-D, ug/kg dw		<500*	<500*
2,4-DB, ug/kg dw		<500*	<500*
2,4,5-T, ug/kg dw		<300*	<300*
2,4,5-TP Silvex, ug/kg dw		<100*	<100*
Dalapon, ug/kg dw		<10000*	<10000*
Dicamba, ug/kg dw		<5000*	<5000*
Dichlorprop, ug/kg dw		<500*	<500*
Dinoseb, ug/kg dw		<500*	<500*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw		<10000*	<10000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw		<10000*	<10000*
Arsenic, mg/kg dw		2.8	<1.0
Chromium, mg/kg dw		4.6	1.3
Zinc, mg/kg dw		6.9	3.9

\* = Increased detection limit is due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-14	11075-15
11075-14	CO-SB-9-01		Client
11075-15	CO-SLUDGE-01		
Volatile Organics			
Benzyl chloride, ug/kg dw		<6.3	<28*
bis(2-Chloroethoxy) methane, ug/kg dw		<6.3	<28*
Bis(2-chloroisopropyl)ether, ug/kg dw		<6.3	<28*
Bromobenzene, ug/kg dw		<6.3	<28*
Bromodichloromethane, ug/kg dw		<6.3	<28*
Benzene, ug/kg dw		<6.3	<28*
Bromoform, ug/kg dw		<6.3	<28*
Bromomethane, ug/kg dw		<6.3	<28*
Carbon Tetrachloride, ug/kg dw		<6.3	<28*
Chloroacetaldehyde, ug/kg dw		<6.3	<28*
Chlorobenzene, ug/kg dw		<6.3	<28*
Chloroethane, ug/kg dw		<6.3	<28*
Chloroform, ug/kg dw		<6.3	<28*
1-Chlorohexane, ug/kg dw		<6.3	<28*
2-Chloroethylvinyl Ether, ug/kg dw		<6.3	<28*
Chloromethane, ug/kg dw		<6.3	<28*
Chloromethyl methyl ether, ug/kg dw		<6.3	<28*
Chlorotoluene, ug/kg dw		<6.3	<28*
Dibromochloromethane, ug/kg dw		<6.3	<28*
Dibromomethane, ug/kg dw		<6.3	<28*
1,2-Dichlorobenzene, ug/kg dw		<6.3	<28*
1,3-Dichlorobenzene, ug/kg dw		<6.3	<28*

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-14	11075-15
11075-14	CO-SB-9-01		Client
11075-15	CO-SLUDGE-01		
1,4-Dichlorobenzene, ug/kg dw		<6.3	<28*
Dichlorodifluoromethane, ug/kg dw		<6.3	<28*
1,1-Dichloroethane, ug/kg dw		<6.3	<28*
1,2-Dichloroethane, ug/kg dw		<6.3	<28*
1,1-Dichloroethene, ug/kg dw		<6.3	<28*
1,2-Dichloropropane, ug/kg dw		<6.3	<28*
1,3-Dichloropropylene, ug/kg dw		<6.3	<28*
Ethylbenzene, ug/kg dw		<6.3	<28*
Methylene Chloride, ug/kg dw		<6.3	<28*
1,1,2,2-Tetrachloroethane, ug/kg dw		<6.3	<28*
1,1,1,2-Tetrachloroethane, ug/kg dw		<6.3	<28*
Tetrachloroethylene, ug/kg dw		<6.3	<28*
Toluene, ug/kg dw		<6.3	<28*
1,1,1-Trichloroethane, ug/kg dw		<6.3	<28*
1,1,2-Trichloroethane, ug/kg dw		<6.3	<28*
Trichloroethene, ug/kg dw		<6.3	<28*
Trichlorofluoromethane, ug/kg dw		<6.3	<28*
Trichloropropane, ug/kg dw		<6.3	<28*
Vinyl Chloride, ug/kg dw		<6.3	<28*
Xylenes, ug/kg dw		<6.3	<28*

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-14	11075-15
Semivolatile Organics (8270)			
1,3-Dichlorobenzene, ug/kg dw	<3700*	<830000*	
1,4-Dichlorobenzene, ug/kg dw	<3700*	<830000*	
Hexachloroethane, ug/kg dw	<3700*	<830000*	
bis(2-Chloroethyl) ether, ug/kg dw	<3700*	<830000*	
1,2-Dichlorobenzene, ug/kg dw	<3700*	<830000*	
Bis(2-chloroisopropyl)ether, ug/kg dw	<3700*	<830000*	
N-Nitrosodi-N-Propylamine, ug/kg dw	<3700*	<830000*	
Nitrobenzene, ug/kg dw	<3700*	<830000*	
Hexachlorobutadiene, ug/kg dw	<3700*	<830000*	
1,2,4-Trichlorobenzene, ug/kg dw	<3700*	<830000*	
Isophorone, ug/kg dw	<3700*	<830000*	
Naphthalene, ug/kg dw	<3700*	<830000*	
bis(2-Chloroethoxy) methane, ug/kg dw	<3700*	<830000*	
Hexachlorocyclopentadiene, ug/kg dw	<3700*	<830000*	
2-Chloronaphthalene, ug/kg dw	<3700*	<830000*	
Acenaphthylene, ug/kg dw	<3700*	<830000*	
Acenaphthene, ug/kg dw	<3700*	<830000*	
Dimethylphthalate, ug/kg dw	<3700*	<830000*	
2,6-Dinitrotoluene, ug/kg dw	<3700*	<830000*	
Fluorene, ug/kg dw	<3700*	<830000*	
4-Chlorophenyl-phenyl ether, ug/kg dw	<3700*	<830000*	
2,4-Dinitrotoluene, ug/kg dw	<3700*	<830000*	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11075-14	11075-15
Diethyl Phthalate, ug/kg dw		<3700*	<830000*
N-Nitrosodiphenylamine, ug/kg dw		<3700*	<830000*
Hexachlorobenzene, ug/kg dw		<3700*	<830000*
gamma-BHC, ug/kg dw		<3700*	<830000*
4-Bromophenyl-phenyl-ether, ug/kg dw		<3700*	<830000*
delta-BHC, ug/kg dw		<3700*	<830000*
Phenanthrene, ug/kg dw		<3700*	<830000*
Anthracene, ug/kg dw		<3700*	<830000*
beta-BHC, ug/kg dw		<3700*	<830000*
Heptachlor, ug/kg dw		<3700*	<830000*
alpha-BHC, ug/kg dw		<3700*	<830000*
Aldrin, ug/kg dw		<3700*	<830000*
Dibutyl phthalate, ug/kg dw		<3700*	<830000*
Heptachlor epoxide, ug/kg dw		<3700*	<830000*
Endosulfan I, ug/kg dw		<3700*	<830000*
Fluoranthene, ug/kg dw		<3700*	<830000*
Dieleadrin, ug/kg dw		<3700*	<830000*
4,4'-DDE, ug/kg dw		<3700*	<830000*
Pyrene, ug/kg dw		<3700*	<830000*
Endrin, ug/kg dw		<3700*	<830000*
Endosulfan II, ug/kg dw		<3700*	<830000*
4,4'-DDD, ug/kg dw		<3700*	<830000*
Benzidine, ug/kg dw		<29000*	<6700000*

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
11075-14	CO-SB-9-01		Client
11075-15	CO-SLUDGE-01		
PARAMETER		11075-14	11075-15
4,4'-DDT, ug/kg dw		<3700*	<830000*
Endosulfan sulfate, ug/kg dw		<3700*	<830000*
Endrin Aldehyde, ug/kg dw		<3700*	<830000*
Butylbenzylphthalate, ug/kg dw		<3700*	<830000*
bis(2-Ethylhexyl) phthalate, ug/kg dw		<3700*	<830000*
Chrysene, ug/kg dw		<3700*	<830000*
Benzo(a)Anthracene, ug/kg dw		<3700*	<830000*
3,3'-Dichlorobenzidine, ug/kg dw		<7300*	<1700000*
Di-n-octylphthalate, ug/kg dw		<3700*	<830000*
Benzo(b)fluoranthene, ug/kg dw		<3700*	<830000*
Benzo (k) Fluoranthene, ug/kg dw		<3700*	<830000*
Benzo(a)pyrene, ug/kg dw		<3700*	<830000*
Indeno (1,2,3-cd)pyrene, ug/kg dw		<3700*	<830000*
Dibenz (a,h)anthracene, ug/kg dw		<3700*	<830000*
Benzo(g,h,i)perylene, ug/kg dw		<3700*	<830000*
N-Nitrosodimethylamine, ug/kg dw		<3700*	<830000*
Chlordane, ug/kg dw		<7300*	<1700000*
Toxaphene, ug/kg dw		<73000*	<17000000*
Aroclor-1016, ug/kg dw		<37000*	<8300000*
Aroclor-1221, ug/kg dw		<37000*	<8300000*
Aroclor-1232, ug/kg dw		<37000*	<8300000*
Aroclor-1242, ug/kg dw		<37000*	<8300000*
Aroclor-1248, ug/kg dw		<37000*	<8300000*

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11075-14	CO-SB-9-01		Client
11075-15	CO-SLUDGE-01		
PARAMETER		11075-14	11075-15
Aroclor-1254, ug/kg dw		<37000*	<8300000*
Aroclor-1260, ug/kg dw		<37000*	<8300000*
2-Chlorophenol, ug/kg dw		<3700*	<830000*
2-Nitrophenol, ug/kg dw		<3700*	<830000*
Phenol, ug/kg dw		<3700*	<830000*
2,4-Dimethylphenol, ug/kg dw		<3700*	<830000*
2,4-Dichlorophenol, ug/kg dw		<3700*	<830000*
2,4,6-Trichlorophenol, ug/kg dw		<3700*	<830000*
4-Chloro-3-methylphenol, ug/kg dw		<3700*	<830000*
2,4-Dinitrophenol, ug/kg dw		<18000*	<4200000*
2-Methyl-4,6-dinitrophenol, ug/kg dw		<18000*	<4200000*
Pentachlorophenol, ug/kg dw		<18000*	<4200000*
4-Nitrophenol, ug/kg dw		<18000*	<4200000*
Benzyl alcohol, ug/kg dw		<3700*	<830000*
2-Methylphenol (o-cresol), ug/kg dw		<3700*	<830000*
4-Methylphenol (p-cresol), ug/kg dw		<3700*	<830000*
Benzoic acid, ug/kg dw		<18000*	<4200000*
4-Chloroaniline, ug/kg dw		<3700*	<830000*
2-Methylnaphthalene, ug/kg dw		<3700*	<830000*
2,4,5-Trichlorophenol, ug/kg dw		<3700*	<830000*
2-Nitroaniline, ug/kg dw		<18000*	<4200000*
3-Nitroaniline, ug/kg dw		<18000*	<4200000*
Dibenzofuran, ug/kg dw		<3700*	<830000*
4-Nitroaniline, ug/kg dw		<18000*	<4200000*

\* = Increased detection limit is due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
Volatile Organics			
Benzyl chloride, ug/l		<1.0	<1.0
bis(2-Chloroethoxy) methane, ug/l		<1.0	<1.0
Bis(2-chloroisopropyl)ether, ug/l		<1.0	<1.0
Bromobenzene, ug/l		<1.0	<1.0
Bromodichloromethane, ug/l		<1.0	<1.0
Benzene, ug/l		<1.0	<1.0
Bromoform, ug/l		<1.0	<1.0
Bromomethane, ug/l		<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0
Chloroacetaldehyde, ug/l		<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<1.0
Chloroethane, ug/l		<1.0	<1.0
Chloroform, ug/l		<1.0	<1.0
1-Chlorohexane, ug/l		<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0
Chloromethane, ug/l		<1.0	<1.0
Chloromethyl methyl ether, ug/l		<1.0	<1.0
Chlorotoluene, ug/l		<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0
Dibromomethane, ug/l		<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
1,4-Dichlorobenzene, ug/l		<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0
1,1-Dichloroethene, ug/l		<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0
1,3-Dichloropropylene, ug/l		<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<1.0
Methylene Chloride, ug/l		<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l		<1.0	<1.0
Tetrachloroethylene, ug/l		<1.0	<1.0
Toluene, ug/l		<1.0	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<1.0
Trichloroethene, ug/l		<1.0	<1.0
Trichlorofluoromethane, ug/l		<1.0	<1.0
Trichloropropane, ug/l		<1.0	<1.0
Vinyl Chloride, ug/l		<1.0	<1.0
Xylenes, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
Semivolatile Organics (8270)			
1,3-Dichlorobenzene, ug/l		<10	<10
1,4-Dichlorobenzene, ug/l		<10	<10
Hexachloroethane, ug/l		<10	<10
bis(2-Chloroethyl) ether, ug/l		<10	<10
1,2-Dichlorobenzene, ug/l		<10	<10
Bis(2-chloroisopropyl)ether, ug/l		<10	<10
N-Nitrosodi-N-Propylamine, ug/l		<10	<10
Nitrobenzene, ug/l		<10	<10
Hexachlorobutadiene, ug/l		<10	<10
1,2,4-Trichlorobenzene, ug/l		<10	<10
Isophorone, ug/l		<10	<10
Naphthalene, ug/l		<10	<10
bis(2-Chloroethoxy) methane, ug/l		<10	<10
Hexachlorocyclopentadiene, ug/l		<10	<10
2-Chloronaphthalene, ug/l		<10	<10
Acenaphthylene, ug/l		<10	<10
Acenaphthene, ug/l		<10	<10
Dimethylphthalate, ug/l		<10	<10
2,6-Dinitrotoluene, ug/l		<10	<10
Fluorene, ug/l		<10	<10
4-Chlorophenyl-phenyl ether, ug/l		<10	<10
2,4-Dinitrotoluene, ug/l		<10	<10

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PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
Diethyl Phthalate, ug/l		<10	<10
N-Nitrosodiphenylamine, ug/l		<10	<10
Hexachlorobenzene, ug/l		<10	<10
gamma-BHC, ug/l		<10	<10
4-Bromophenyl-phenyl-ether, ug/l		<10	<10
delta-BHC, ug/l		<10	<10
Phenanthrene, ug/l		<10	<10
Anthracene, ug/l		<10	<10
beta-BHC, ug/l		<10	<10
Heptachlor, ug/l		<10	<10
alpha-BHC, ug/l		<10	<10
Aldrin, ug/l		<10	<10
Dibutyl phthalate, ug/l		<10	<10
Heptachlor epoxide, ug/l		<10	<10
Endosulfan I, ug/l		<10	<10
Fluoranthene, ug/l		<10	<10
Dieldrin, ug/l		<10	<10
4,4'-DDE, ug/l		<10	<10
Pyrene, ug/l		<10	<10
Endrin, ug/l		<10	<10
Endosulfan II, ug/l		<10	<10
4,4'-DDD, ug/l		<10	<10
Benzidine, ug/l		<80	<80

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
4,4'-DDT, ug/l		<10	<10
Endosulfan sulfate, ug/l		<10	<10
Endrin Aldehyde, ug/l		<10	<10
Butylbenzylphthalate, ug/l		<10	<10
bis(2-Ethylhexyl) phthalate, ug/l		<10	<10
Chrysene, ug/l		<10	<10
Benzo(a)Anthracene, ug/l		<10	<10
3,3'-Dichlorobenzidine, ug/l		<20	<20
Di-n-octylphthalate, ug/l		<10	<10
Benzo(b)fluoranthene, ug/l		<10	<10
Benzo (k) Fluoranthene, ug/l		<10	<10
Benzo(a)pyrene, ug/l		<10	<10
Indeno (1,2,3-cd)pyrene, ug/l		<10	<10
Dibenz (a,h)anthracene, ug/l		<10	<10
Benzo(g,h,i)perylene, ug/l		<10	<10
N-Nitrosodimethylamine, ug/l		<10	<10
Chlordane, ug/l		<20	<20
Toxaphene, ug/l		<200	<200
Aroclor-1016, ug/l		<100	<100
Aroclor-1221, ug/l		<100	<100
Aroclor-1232, ug/l		<100	<100
Aroclor-1242, ug/l		<100	<100
Aroclor-1248, ug/l		<100	<100

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
Aroclor-1254, ug/l		<100	<100
Aroclor-1260, ug/l		<100	<100
2-Chlorophenol, ug/l		<10	<10
2-Nitrophenol, ug/l		<10	<10
Phenol, ug/l		<10	<10
2,4-Dimethylphenol, ug/l		<10	<10
2,4-Dichlorophenol, ug/l		<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10
2,4-Dinitrophenol, ug/l		<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50
Pentachlorophenol, ug/l		<50	<50
4-Nitrophenol, ug/l		<50	<50
Benzyl alcohol, ug/l		<10	<10
2-Methylphenol (o-cresol), ug/l		<10	<10
4-Methylphenol (p-cresol), ug/l		<10	<10
Benzoic acid, ug/l		<50	<50
4-Chloroaniline, ug/l		<10	<10
2-Methylnaphthalene, ug/l		<10	<10
2,4,5-Trichlorophenol, ug/l		<10	<10
2-Nitroaniline, ug/l		<50	<50
3-Nitroaniline, ug/l		<50	<50
Dibenzofuran, ug/l		<10	<10
4-Nitroaniline, ug/l		<50	<50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
<b>Organophosphorus Pesticides</b>			
Azinphos methyl, ug/l		<1.0	<1.0
Bolstar (Sulprofos), ug/l		<0.050	<0.050
Chlorpyrifos, ug/l		<0.010	<0.010
Coumaphos, ug/l		<0.50	<0.50
Demeton-O, ug/l		<0.10	<0.10
Demeton-S, ug/l		<0.10	<0.10
Diazinon, ug/l		<0.050	<0.050
Dichlorvos, ug/l		<0.10	<0.10
Disulfoton, ug/l		<0.050	<0.050
Ethoprop, ug/l		<0.010	<0.010
Fensulfothion, ug/l		<0.50	<0.50
Fenthion, ug/l		<0.010	<0.010
Merphos, ug/l		<0.050	<0.050
Mevinphos, ug/l		<0.010	<0.010
Naled, ug/l		<0.10	<0.10
Methyl Parathion, ug/l		<0.050	<0.050
Phorate, ug/l		<0.010	<0.010
Ronnel, ug/l		<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l		<0.050	<0.050
Tokuthion (Prothifofos), ug/l		<0.050	<0.050
Trichloronate, ug/l		<0.50	<0.50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11075-16	11075-17
11075-16	Field Blank		Client
11075-17	Equipment Blank		
Chlorinated Herbicides (8150)			
2,4-D, ug/l		<0.50	<0.50
2,4-DB, ug/l		<0.50	<0.50
2,4,5-T, ug/l		<0.30	<0.30
2,4,5-TP Silvex, ug/l		<0.10	<0.10
Dalapon, ug/l		<10	<10
Dicamba, ug/l		<5.0	<5.0
Dichlorprop, ug/l		<0.50	<0.50
Dinoseb, ug/l		<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	<10
Arsenic, mg/l		<0.010	<0.010
Chromium, mg/l		<0.010	<0.010
Zinc, mg/l		<0.020	<0.020

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-18	Trip Blank	Client
PARAMETER	11075-18	
<hr/>		
Volatile Organics		
Benzyl chloride, ug/l	<1.0	
bis(2-Chloroethoxy) methane, ug/l	<1.0	
Bis(2-chloroisopropyl)ether, ug/l	<1.0	
Bromobenzene, ug/l	<1.0	
Bromodichloromethane, ug/l	<1.0	
Benzene, ug/l	<1.0	
Bromoform, ug/l	<1.0	
Bromomethane, ug/l	<1.0	
Carbon Tetrachloride, ug/l	<1.0	
Chloroacetaldehyde, ug/l	<1.0	
Chlorobenzene, ug/l	<1.0	
Chloroethane, ug/l	<1.0	
Chloroform, ug/l	<1.0	
1-Chlorohexane, ug/l	<1.0	
2-Chloroethylvinyl Ether, ug/l	<1.0	
Chloromethane, ug/l	<1.0	
Chloromethyl methyl ether, ug/l	<1.0	
Chlorotoluene, ug/l	<1.0	
Dibromochloromethane, ug/l	<1.0	
Dibromomethane, ug/l	<1.0	
1,2-Dichlorobenzene, ug/l	<1.0	
1,3-Dichlorobenzene, ug/l	<1.0	
1,4-Dichlorobenzene, ug/l	<1.0	

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## REPORT OF RESULTS

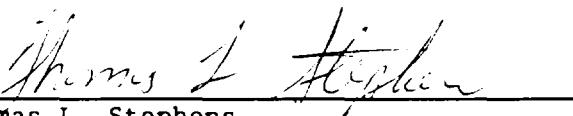
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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11075-18	Trip Blank	Client
<hr/>		
PARAMETER		11075-18
<hr/>		
Dichlorodifluoromethane, ug/l	<1.0	
1,1-Dichloroethane, ug/l	<1.0	
1,2-Dichloroethane, ug/l	<1.0	
1,1-Dichloroethene, ug/l	<1.0	
1,2-Dichloropropane, ug/l	<1.0	
1,3-Dichloropropylene, ug/l	<1.0	
Ethylbenzene, ug/l	<1.0	
Methylene Chloride, ug/l	<1.0	
1,1,2,2-Tetrachloroethane, ug/l	<1.0	
1,1,1,2-Tetrachloroethane, ug/l	<1.0	
Tetrachloroethylene, ug/l	<1.0	
Toluene, ug/l	<1.0	
1,1,1-Trichloroethane, ug/l	<1.0	
1,1,2-Trichloroethane, ug/l	<1.0	
Trichloroethene, ug/l	<1.0	
Trichlorofluoromethane, ug/l	<1.0	
Trichloropropane, ug/l	<1.0	
Vinyl Chloride, ug/l	<1.0	
Xylenes, ug/l	<1.0	
<hr/>		

Method: EPA 40 CFR Part 136

Method: EPA SW-846

HRS Certification #'s:81291,87279,E81005,E87052

  
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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
11097-1	CO-SB-17-01					Client
11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
<hr/>						
Volatile Organics						
Benzyl chloride, ug/kg dw		<110	<160	<600	<320	<690
bis(2-Chloroethoxy) methane, ug/kg dw		<110	<160	<600	<320	<690
Bis(2-chloroisopropyl)ether , ug/kg dw		<110	<160	<120	<320	<690
Bromobenzene, ug/kg dw		<110	<160	<120	<320	<690
Bromodichloromethane, ug/kg dw		<110	<160	<120	<320	<690
Benzene, ug/kg dw		<110	<160	<120	<320	<690
Bromoform, ug/kg dw		<110	<160	<120	<320	<690
Bromomethane, ug/kg dw		<110	<160	<120	<320	<690
Carbon Tetrachloride, ug/kg dw		<110	<160	<120	<320	<690
Chloroacetaldehyde, ug/kg dw		<110	<160	<120	<320	<690
Chlorobenzene, ug/kg dw		710	900	610	<320	760
Chloroethane, ug/kg dw		<110	<160	<120	<320	<690
Chloroform, ug/kg dw		<110	<160	<120	<320	<690
1-Chlorohexane, ug/kg dw		<110	<160	<120	<320	<690
2-Chloroethylvinyl Ether, ug/kg dw		<110	<160	<120	<320	<690
Chloromethane, ug/kg dw		<110	<160	<120	<320	<690
Chloromethyl methyl ether, ug/kg dw		<110	<160	<120	<320	<690

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11097-1	CO-SB-17-01				Client	
11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
Chlorotoluene, ug/kg dw		<110	<160	<120	<320	<690
Dibromochloromethane, ug/kg dw		<110	<160	<120	<320	<690
Dibromomethane, ug/kg dw		<110	<160	<120	<320	<690
1,2-Dichlorobenzene, ug/kg dw		<110	<160	<120	<320	<690
1,3-Dichlorobenzene, ug/kg dw		<110	<160	<120	<320	<690
1,4-Dichlorobenzene, ug/kg dw		3200	3800	<120	<320	<690
Dichlorodifluoromethane, ug/kg dw		<110	<160	<120	<320	<690
1,1-Dichloroethane, ug/kg dw		<110	<160	<120	<320	<690
1,2-Dichloroethane, ug/kg dw		<110	<160	<120	<320	<690
1,1-Dichloroethene, ug/kg dw		<110	<160	<120	<320	<690
1,2-Dichloropropane, ug/kg dw		<110	<160	<120	<320	<690
1,3-Dichloropropylene, ug/kg dw		<110	<160	<120	<320	<690
Ethylbenzene, ug/kg dw		230	360	2100	510	4000
Methylene Chloride, ug/kg dw		<110	<160	<120	<320	<690
1,1,2,2-Tetrachloroethane, ug/kg dw		<110	<160	<120	<320	<690
1,1,1,2-Tetrachloroethane, ug/kg dw		<110	<160	<120	<320	<690
Tetrachloroethylene, ug/kg dw		<110	<160	<120	<320	<690
Toluene, ug/kg dw		480	220	<120	<320	690

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
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11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
1,1,1-Trichloroethane, ug/kg dw	<110	<160	<120	<320	<690	
1,1,2-Trichloroethane, ug/kg dw	<110	<160	<120	<320	<690	
Trichloroethene, ug/kg dw	<110	<160	<120	<320	<690	
Trichlorofluoromethane, ug/kg dw	<110	<160	<120	<320	<690	
Trichloroproppane, ug/kg dw	<110	<160	<120	<320	<690	
Vinyl Chloride, ug/kg dw	<110	<160	<120	<320	<690	
Xylenes, ug/kg dw	1600	4200	10000	3500	19000	

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11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
<b>Semivolatile Organics (8270)</b>						
1,3-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
1,4-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Hexachloroethane, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
bis(2-Chloroethyl) ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
1,2-Dichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Bis(2-chloroisopropyl)ether , ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
N-Nitrosodi-N-Propylamine, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Nitrobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Hexachlorobutadiene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
1,2,4-Trichlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Isophorone, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Naphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
bis(2-Chloroethoxy) methane, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Hexachlorocyclopentadiene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	

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11097-1	CO-SB-17-01				Client	
11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
2-Chloronaphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Acenaphthylene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Acenaphthene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Dimethylphthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
2,6-Dinitrotoluene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Fluorene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
4-Chlorophenyl-phenyl ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
2,4-Dinitrotoluene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Diethyl Phthalate, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
N-Nitrosodiphenylamine, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Hexachlorobenzene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
gamma-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
4-Bromophenyl-phenyl-ether, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
delta-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Phenanthrene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Anthracene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
beta-BHC, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	

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11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
Heptachlor, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
alpha-BHC, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Aldrin, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Dibutyl phthalate, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Heptachlor epoxide, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan I, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Fluoranthene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Dieldrin, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
4,4'-DDE, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Pyrene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Endrin, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan II, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
4,4'-DDD, ug/kg dw		68000	48000	17000	21000	180000
Benzidine, ug/kg dw		<320000*	<300000*	<54000*	<135000*	<240000*
4,4'-DDT, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Endosulfan sulfate, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Endrin Aldehyde, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Butylbenzylphthalate, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
bis(2-Ethylhexyl) phthalate, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*

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11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
Chrysene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(a)Anthracene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
3,3'-Dichlorobenzidine, ug/kg dw		<80000*	<74000*	<14000*	<34000*	<60000*
Di-n-octylphthalate, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(b)fluoranthene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Benzo (k) Fluoranthene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(a)pyrene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Indeno (1,2,3-cd)pyrene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Dibenz (a,h)anthracene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Benzo(g,h,i)perylene, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
N-Nitrosodimethylamine, ug/kg dw		<40000*	<37000*	<6800*	<17000*	<30000*
Chlordane, ug/kg dw		<80000*	<74000*	26000	<34000*	170000
Toxaphene, ug/kg dw		<800000*	<740000*	<140000*	<340000*	<600000*
Aroclor-1016, ug/kg dw		<400000*	<370000*	<68000*	<170000*	<300000*
Aroclor-1221, ug/kg dw		<400000*	<370000*	<68000*	<170000*	<300000*

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
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11097-2	CO-SB-17-02					
11097-3	CO-SB-18-01					
11097-4	CO-SB-18-02					
11097-5	CO-SB-19-01					
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
4-Methylphenol (p-cresol), ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
Benzoic acid, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*	
4-Chloroaniline, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
2-Methylnaphthalene, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
2,4,5-Trichlorophenol, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
2-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*	
3-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*	
Dibenzofuran, ug/kg dw	<40000*	<37000*	<6800*	<17000*	<30000*	
4-Nitroaniline, ug/kg dw	<200000*	<190000*	<34000*	<84000*	<150000*	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11097-1	11097-2	11097-3	11097-4	11097-5
	Organophosphorus Pesticides					
	Azinphos methyl, ug/kg dw	<220	<200	<210	<210	<200
	Bolstar (Sulprofos), ug/kg dw	<11	<10	<11	<10	<10
	Chlorpyrifos, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.0
	Coumaphos, ug/kg dw	<110	<100	<100	<100	<100
	Demeton-O, ug/kg dw	62	82	170	170	210
	Demeton-S, ug/kg dw	200	220	57	57	1400
	Diazinon, ug/kg dw	<11	<10	<10	<10	<10
	Dichlorvos, ug/kg dw	<22	<20	<21	<21	<21
	Disulfoton, ug/kg dw	<11	<10	<10	<10	<10
	Ethoprop, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
	Fensulfothion, ug/kg dw	<110	<100	<100	<100	<100
	Fenthion, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.0
	Morphos, ug/kg dw	<11	<10	<10	<10	<10
	Mevinphos, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
	Naled, ug/kg dw	<22	<20	<2.1	<21	<21
	Methyl Parathion, ug/kg dw	<11	<10	<10	<10	<10
	Phorate, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
	Ronnel, ug/kg dw	<2.2	<2.0	<2.1	<2.1	<2.1
	Stirophos (Tetrachlorvinphos), ug/kg dw	<11	<10	<10	<10	<10
	Tokuthion (Prothifofos), ug/kg dw	<11	<10	<10	<10	<10
	Trichloronate, ug/kg dw	<110	<100	<100	<100	<100

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11097-2	CO-SB-17-02	
11097-3	CO-SB-18-01	
11097-4	CO-SB-18-02	
11097-5	CO-SB-19-01	

PARAMETER	11097-1	11097-2	11097-3	11097-4	11097-5
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
2,4-DB, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
2,4,5-T, ug/kg dw	<3900*	<3200*	<350*	<35000*	<300*
2,4,5-TP Silvex, ug/kg dw	<1300*	<1100*	<120*	<12000*	<100*
Dalapon, ug/kg dw	<130000*	<130000*	<12000*	<1200000*	<10000*
Dicamba, ug/kg dw	<65000*	<63000*	<5900*	<600000*	<5000*
Dichlorprop, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
Dinoseb, ug/kg dw	<6500*	<5300*	<590*	<60000*	<500*
(4-Chloro-2-Methylphenoxy)-	<130000*	<130000*	<12000*	<1200000*	<10000*
Acetic Acid, ug/kg dw					
2-(4-Chloro-2-Methylphenoxy	<130000*	<130000*	<12000*	<1200000*	<10000*
) -Propanoic Acid, ug/kg dw					
Arsenic, mg/kg dw	<0.83	1.1	<0.98	1.6	3.5
Chromium, mg/kg dw	6.7	12	4.2	10	13
Zinc, mg/kg dw	16	3.0	2.6	4.3	<1.8

\* = Increased detection limit is due to matrix interference.

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
Volatile Organics						
Benzyl chloride, ug/kg dw	<5.8	<110	<120	<130	<610	
bis(2-Chloroethoxy)	<5.8	<110	<120	<130	<610	
methane, ug/kg dw						
Bis(2-chloroisopropyl)ether	<5.8	<110	<120	<130	<610	
, ug/kg dw						
Bromobenzene, ug/kg dw	<5.8	<110	<120	<130	<610	
Bromodichloromethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Benzene, ug/kg dw	<5.8	<110	<120	<130	<610	
Bromoform, ug/kg dw	<5.8	<110	<120	<130	<610	
Bromomethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Carbon Tetrachloride, ug/kg dw	<5.8	<110	<120	<130	<610	
Chloroacetaldehyde, ug/kg dw	<5.8	<110	<120	<130	<610	
Chlorobenzene, ug/kg dw	<5.8	1800	130	300	<610	
Chloroethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Chloroform, ug/kg dw	<5.8	<110	<120	<130	<610	
1-Chlorohexane, ug/kg dw	<5.8	<110	<120	<130	<610	
2-Chloroethylvinyl Ether, ug/kg dw	<5.8	<110	<120	<130	<610	
Chloromethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Chloromethyl methyl ether,	<5.8	<110	<120	<130	<610	
ug/kg dw						

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
Chlorotoluene, ug/kg dw	<5.8	<110	<120	<130	<610	
Dibromochloromethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Dibromomethane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,2-Dichlorobenzene, ug/kg dw	<5.8	<110	<120	<130	<610	
1,3-Dichlorobenzene, ug/kg dw	<5.8	<110	<120	<130	<610	
1,4-Dichlorobenzene, ug/kg dw	<5.8	3600	<120	<130	<610	
Dichlorodifluoromethane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,1-Dichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,2-Dichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,1-Dichloroethene, ug/kg dw	<5.8	<110	<120	<130	<610	
1,2-Dichloropropane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,3-Dichloropropylene, ug/kg dw	<5.8	<110	<120	<130	<610	
Ethylbenzene, ug/kg dw	<5.8	1500	2200	64000	14000	
Methylene Chloride, ug/kg dw	<5.8	<110	<120	<130	<610	
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.8	<110	<120	<130	<610	
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.8	<110	<120	<130	<610	
Tetrachloroethylene, ug/kg dw	<5.8	<110	<120	<130	<610	
Toluene, ug/kg dw	<5.8	720	380	490	620	

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11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
1,1,1-Trichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
1,1,2-Trichloroethane, ug/kg dw	<5.8	<110	<120	<130	<610
Trichloroethene, ug/kg dw	<5.8	<110	<120	<130	<610
Trichlorofluoromethane, ug/kg dw	<5.8	<110	<120	<130	<610
Trichloroproppane, ug/kg dw	<5.8	<110	<120	<130	<610
Vinyl Chloride, ug/kg dw	<5.8	<110	<120	<130	<610
Xylenes, ug/kg dw	26	6200	190000	470000	100000

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11097-7	CO-SB-21-01	
11097-8	CO-SB-22-01	
11097-9	CO-SB-22-02	
11097-10	CO-SB-23-01	

PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Semivolatile Organics (8270)					
1,3-Dichlorobenzene, ug/kg dw	<350	<34000*	<1800*	<16000*	<39000*
1,4-Dichlorobenzene, ug/kg dw	<350	<34000*	<1800*	<16000*	<39000*
Hexachloroethane, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
bis(2-Chloroethyl) ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
1,2-Dichlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Bis(2-chloroisopropyl)ether , ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
N-Nitrosodi-N-Propylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Nitrobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorobutadiene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
1,2,4-Trichlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Isophorone, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Naphthalene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
bis(2-Chloroethoxy)methane, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorocyclopentadiene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2-Chloronaphthalene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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11097-7	CO-SB-21-01				
11097-8	CO-SB-22-01				
11097-9	CO-SB-22-02				
11097-10	CO-SB-23-01				
PARAMETER	11097-6	11097-7	11097-8	11097-9	11097-10
Acenaphthylene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Acenaphthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Dimethylphthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,6-Dinitrotoluene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Fluorene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Chlorophenyl-phenyl ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
2,4-Dinitrotoluene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Diethyl Phthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
N-Nitrosodiphenylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Hexachlorobenzene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
gamma-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
4-Bromophenyl-phenyl-ether, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
delta-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Phenanthrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Anthracene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
beta-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
Heptachlor, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*
alpha-BHC, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
Aldrin, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Dibutyl phthalate, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Heptachlor epoxide, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Endosulfan I, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Fluoranthene, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Dieldrin, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
4,4'-DDE, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Pyrene, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Endrin, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Endosulfan II, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
4,4'-DDD, ug/kg dw		<350	51000	<18000*	40000	120000
Benzidine, ug/kg dw		<2800	<280000*	<140000*	<130000*	<310000*
4,4'-DDT, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Endosulfan sulfate, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Endrin Aldehyde, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Butylbenzylphthalate, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
bis(2-Ethylhexyl) phthalate, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Chrysene, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Benzo(a)Anthracene, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
3,3'-Dichlorobenzidine, ug/kg dw	<700	<69000*	<36000*	<33000*	<79000*	
Di-n-octylphthalate, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Benzo(b)fluoranthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Benzo (k) Fluoranthene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Benzo(a)pyrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Dibenz (a,h)anthracene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Benzo(g,h,i)perylene, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
N-Nitrosodimethylamine, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
Chlordane, ug/kg dw	<700	<69000*	170000	250000	<170000	
Toxaphene, ug/kg dw	<7000	<690000*	<360000*	<330000*	<790000*	
Aroclor-1016, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1221, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1232, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1242, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1248, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1254, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
Aroclor-1260, ug/kg dw	<3500	<340000*	<180000*	<160000*	<390000*	
2-Chlorophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	
2-Nitrophenol, ug/kg dw	<350	<34000*	<18000*	<16000*	<39000*	

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
Phenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2,4-Dimethylphenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2,4-Dichlorophenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2,4,6-Trichlorophenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
4-Chloro-3-methylphenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2,4-Dinitrophenol, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
2-Methyl-4,6-dinitrophenol, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
Pentachlorophenol, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
4-Nitrophenol, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
Benzyl alcohol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2-Methylphenol (o-cresol), ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
4-Methylphenol (p-cresol), ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
Benzoic acid, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
4-Chloroaniline, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2-Methylnaphthalene, ug/kg dw		<350	<34000*	<18000*	16000	41000
2,4,5-Trichlorophenol, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
2-Nitroaniline, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
3-Nitroaniline, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*
Dibenzofuran, ug/kg dw		<350	<34000*	<18000*	<16000*	<39000*
4-Nitroaniline, ug/kg dw		<1800	<170000*	<89000*	<82000*	<200000*

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
PARAMETER		11097-6	11097-7	11097-8	11097-9	11097-10
<b>Organophosphorus Pesticides</b>						
Azinphos methyl, ug/kg dw	<190	<170	<200	<210	<9500*	
Bolstar (Sulprofos), ug/kg dw	<9.6	<8.4	<10	<10	<480*	
Chlorpyrifos, ug/kg dw	<1.9	<1.7	<2.0	<2.1	1900	
Coumaphos, ug/kg dw	<96	<84	<100	<100	<4800*	
Demeton-0, ug/kg dw	<19	<17	220	200	490	
Demeton-S, ug/kg dw	<19	<17	230	<21	1100	
Diazinon, ug/kg dw	<9.6	<8.4	<10	<10	<9.6	
Dichlorvos, ug/kg dw	<19	<17	<21	<21	<19	
Disulfoton, ug/kg dw	<9.6	<8.4	<10	<10	<9.6	
Ethoprop, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<1.9	
Fensulfothion, ug/kg dw	<96	<84	<100	<100	<96	
Fenthion, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<95*	
Merphos, ug/kg dw	<9.6	<8.4	<10	<10	<480*	
Mevinphos, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<1.9	
Naled, ug/kg dw	<19	<17	<21	50	<19	
Methyl Parathion, ug/kg dw	<9.6	<8.4	<10	<10	<480*	
Phorate, ug/kg dw	<1.9	<1.7	<2.1	<2.1	28	
Ronnel, ug/kg dw	<1.9	<1.7	<2.1	<2.1	<95*	
Stirophos (Tetrachlorvinphos), ug/kg dw	<9.6	<8.4	<10	<10	<480*	
Tokuthion (Prothiofos), ug/kg dw	<9.6	<8.4	<10	<10	<480*	
Trichloronate, ug/kg dw	<96	<84	<100	<100	<4800*	

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11097-7	CO-SB-21-01					
11097-8	CO-SB-22-01					
11097-9	CO-SB-22-02					
11097-10	CO-SB-23-01					
		11097-6	11097-7	11097-8	11097-9	11097-10
PARAMETER						
Chlorinated Herbicides (8150)						
2,4-D, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*	
2,4-DB, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*	
2,4,5-T, ug/kg dw	<60	<12000*	<3000*	<600*	<15000*	
2,4,5-TP Silvex, ug/kg dw	<20	<3900*	<1000*	<200*	<4900*	
Dalapon, ug/kg dw	<2000	<400000*	<100000*	<20000*	<500000*	
Dicamba, ug/kg dw	<1000	<200000*	<5000*	<10000*	<25000*	
Dichlorprop, ug/kg dw	<100	<20000*	<5000*	<1000*	<25000*	
Dinoseb, ug/kg dw	<2000	<400000*	<100000*	<10000*	<500000*	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<2000	<400000*	<100000*	<10000*	<500000*	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<2000	<400000*	<100000*	1.2	1.7	<0.99
Arsenic, mg/kg dw	<0.93	<0.88	3.6	2.9	14	2.7
Chromium, mg/kg dw	6.1	3.6		13	52	7.8
Zinc, mg/kg dw	<1.9	<1.8				

Di      \* = Increased detection limit is due to matrix  
 --      interference.

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PARAMETER		11097-11	11097-12	11097-13	11097-14
1,2-Dichlorobenzene, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,3-Dichlorobenzene, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,4-Dichlorobenzene, ug/kg dw		<63000	<6.1	<5.7	<5.8
Dichlorodifluoromethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1-Dichloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,2-Dichloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1-Dichloroethylene, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,2-Dichloropropane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,3-Dichloropropylene, ug/kg dw		<63000	<6.1	<5.7	<5.8
Ethylbenzene, ug/kg dw		280000	<6.1	<5.7	<5.8
Methylene Chloride, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1,2,2-Tetrachloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1,1,2-Tetrachloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
Tetrachloroethylene, ug/kg dw		<63000	<6.1	<5.7	<5.8
Toluene, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1,1-Trichloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
1,1,2-Trichloroethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
Trichloroethylene, ug/kg dw		<63000	<6.1	<5.7	<5.8
Trichlorofluoromethane, ug/kg dw		<63000	<6.1	<5.7	<5.8
Trichloropropane, ug/kg dw		<63000	<6.1	<5.7	<5.8
Vinyl Chloride, ug/kg dw		<63000	<6.1	<5.7	<5.8
Xylenes, ug/kg dw		1900000	22	<5.7	24

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER		11097-11	11097-12	11097-13	11097-14
<b>Semivolatile Organics (8270)</b>					
1,3-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310	<310
1,4-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310	<310
Hexachloroethane, ug/kg dw	<33000*	<340	<340	<310	<310
bis(2-Chloroethyl) ether, ug/kg dw	<33000*	<340	<340	<310	<310
1,2-Dichlorobenzene, ug/kg dw	<33000*	<340	<340	<310	<310
Bis(2-chloroisopropyl)ether, ug/kg dw	<33000*	<340	<340	<310	<310
N-Nitrosodi-N-Propylamine, ug/kg dw	<33000*	<340	<340	<310	<310
Nitrobenzene, ug/kg dw	<33000*	<340	<340	<310	<310
Hexachlorobutadiene, ug/kg dw	<33000*	<340	<340	<310	<310
1,2,4-Trichlorobenzene, ug/kg dw	<33000*	<340	<340	<310	<310
Isophorone, ug/kg dw	<33000*	<340	<340	<310	<310
Naphthalene, ug/kg dw	<33000*	<340	<340	<310	<310
bis(2-Chloroethoxy) methane, ug/kg dw	<33000*	<340	<340	<310	<310
Hexachlorocyclopentadiene, ug/kg dw	<33000*	<340	<340	<310	<310
2-Chloronaphthalene, ug/kg dw	<33000*	<340	<340	<310	<310
Acenaphthylene, ug/kg dw	<33000*	<340	<340	<310	<310
Acenaphthene, ug/kg dw	<33000*	<340	<340	<310	<310
Dimethylphthalate, ug/kg dw	<33000*	<340	<340	<310	<310
2,6-Dinitrotoluene, ug/kg dw	<33000*	<340	<340	<310	<310
Fluorene, ug/kg dw	<33000*	<340	<340	<310	<310

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-1	CO-MW-M-01	Client
11187-2	CO-MW-O-01	
11187-3	CO-MW-P-01	
11187-4	CO-MW-A-01	
11187-5	CO-MW-A-02	

PARAMETER	11187-1	11187-2	11187-3	11187-4	11187-5
Chlorinated Herbicides (615)					
2,4-D, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
2,4-DB, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
Dicamba, ug/l	<5.0	<100*	<5.0	<5.0	<5.0
Dichlorprop, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
Dinoseb, ug/l	<0.50	<10*	<0.50	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<200*	<10	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<200*	<10	<10	<10
2,4,5-T, ug/l	<0.30	<6.0*	<0.30	<0.30	<0.30
2,4,5-TP Silvex, ug/l	<0.10	<2.0*	<0.10	<0.10	<0.10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
	Chlorinated Pesticides (608)					
	Aldrin, ug/l	<0.010	<1.0*	13	<0.010	<0.010
	Alpha-BHC, ug/l	0.027	21	4.5	<0.010	<0.010
	Beta-BHC, ug/l	0.096	52	22	<0.010	<0.010
	Delta-BHC, ug/l	0.020	21	5.9	<0.010	<0.010
	Gamma-BHC, ug/l	0.044	17	1.5	<0.010	<0.010
	Chlordane, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
	4,4'-DDD, ug/l	<0.020	<2.0*	<1.0*	<0.020	<0.020
	4,4'-DDE, ug/l	<0.020	<2*	<1.0*	<0.020	<0.020
	4,4'-DDT, ug/l	<0.050	<5.0*	<2.5*	<0.050	<0.050
	Dieldrin, ug/l	0.071	<2*	<1.0*	<0.020	<0.020
	Endosulfan I, ug/l	<0.020	<2*	<1.0*	<0.020	<0.020
	Endosulfan II, ug/l	<0.050	<5.0*	<2.5*	<0.050	<0.050
	Endosulfan Sulfate, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
	Endrin, ug/l	0.021	<2.0*	<1.0*	<0.020	<0.020
	Endrin Aldehyde, ug/l	<0.10	<10*	<5.0*	<0.10	<0.10
	Heptachlor, ug/l	<0.010	<1.0*	<0.50*	<0.010	<0.010
	Heptachlor Epoxide, ug/l	<0.020	<2.0*	<1.0*	<0.020	<0.020
	Toxaphene, ug/l	<1.0	<100*	<50*	<1.0	<1.0
	PCB-1016, ug/l	<0.50	<50*	<25*	<0.50	<0.50

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PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
PCB-1221, ug/l		<0.50	<50*	<25*	<0.50	<0.50
PCB-1232, ug/l		<0.50	<50*	<25*	<0.50	<0.50
PCB-1242, ug/l		<0.50	<50*	<25*	<0.50	<0.50
PCB-1248, ug/l		<0.50	<50*	<25*	<0.50	<0.50
PCB-1254, ug/l		<0.50	<50*	<25*	<0.50	<0.50
PCB-1260, ug/l		<0.50	<50*	<25*	<0.50	<0.50
Arsenic, mg/l		<0.010	<0.010	<0.010	<0.010	<0.010
Chromium, mg/l		<0.010	<0.010	0.059	0.10	0.043
Zinc, mg/l		0.027	0.044	0.053	0.054	0.12

\* = Increased detection limit is due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
601 and 602						
Bromodichloromethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Bromoform, ug/l		<1.0	<1.0	<25	<50	<1.0
Bromomethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Benzene, ug/l		<1.0	<1.0	<25	<50	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0	<25	<50	<1.0
Chlorobenzene, ug/l		2.7	5.1	<25	<50	<1.0
Chloroethane, ug/l		<1.0	<1.0	<25	<50	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0	<25	<50	<1.0
Chloroform, ug/l		<1.0	2.8	<25	<50	<1.0
Ethylbenzene, ug/l		1.5	5.7	350	180	<1.0
Chloromethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0	<25	<50	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0	<25	<50	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0	<25	<50	<1.0
1,4-Dichlorobenzene, ug/l		1.5	<1.0	<25	<50	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0	<25	<50	<1.0
1,1-Dichloroethane, ug/l		<1.0	1.2	<25	<50	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0	<25	<50	<1.0
1,1-Dichloroethene, ug/l		<1.0	1.8	<25	<50	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11187-6	CO-MW-N-01					Client
11187-7	CO-MW-F-01					
11187-8	CO-MW-I-01					
11187-9	CO-MW-G-01					
11187-10	CO-MW-D-01					
PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
cis/trans-1,2-Dichloroethyl ene, ug/l		<1.0	<1.0	<25	<50	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0	<25	<50	<1.0
Cis-1,3-Dichloropropene, ug/l		<1.0	<1.0	<25	<50	<1.0
Trans-1,3-Dichloropropene, ug/l		<1.0	<1.0	<25	<50	<1.0
Methylene Chloride, ug/l		<1.0	<1.0	<25	<50	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Tetrachloroethylene, ug/l		<1.0	<1.0	<25	<50	<1.0
Toluene, ug/l		<1.0	<1.0	<25	<50	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<1.0	<25	<50	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Trichloroethene, ug/l		<1.0	<1.0	<25	<50	<1.0
Trichlorofluoromethane, ug/l		<1.0	<1.0	<25	<50	<1.0
Vinyl Chloride, ug/l		<1.0	<1.0	<25	<50	<1.0
Xylenes, ug/l		<1.0	15	730	920	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
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11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
<b>BN-A Extractables (625)</b>					
Acenaphthene, ug/l	<10	<10	<10	<10	<10
Acenaphthylene, ug/l	<10	<10	<10	<10	<10
Anthracene, ug/l	<10	<10	<10	<10	<10
Aldrin, ug/l	<10	<10	<10	<10	<10
Benzo(a)Anthracene, ug/l	<10	<10	<10	<10	<10
Benzo(b)fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo (k) Fluoranthene, ug/l	<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l	<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l	<10	<10	<10	<10	<10
Benzyl butyl phthalate, ug/l	<10	<10	<10	<10	<10
beta-BHC, ug/l	<10	<10	<10	<10	<10
delta-BHC, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethyl) ether, ug/l	<10	<10	<10	<10	<10
bis(2-Chloroethoxy) methane, ug/l	<10	<10	<10	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l	<10	<10	<10	<10	<10
Bis(2-chloroisopropyl)ether, ug/l	<10	<10	<10	<10	<10
4-Bromophenyl-phenyl-ether, ug/l	<10	<10	<10	<10	<10
Chlordane, ug/l	<20	<20	<20	<20	<20
2-Chloronaphthalene, ug/l	<10	<10	<10	<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11187-6	CO-MW-N-01					Client
11187-7	CO-MW-F-01					
11187-8	CO-MW-I-01					
11187-9	CO-MW-G-01					
11187-10	CO-MW-D-01					
PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
4-Chlorophenyl-phenyl ether, ug/l	<10	<10	<10	<10	<10	<10
Chrysene, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDD, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDE, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDT, ug/l	<10	<10	<10	<10	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10	<10	<10	<10	<10
Di-n-butylphthalate, ug/l	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20	<20	<20	<20	<20
Dieldrin, ug/l	<10	<10	<10	<10	<10	<10
Diethyl Phthalate, ug/l	<10	<10	<10	<10	<10	<10
Dimethyl phthalate, ug/l	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10	<10
Di-n-octylphthalate, ug/l	<10	<10	<10	<10	<10	<10
Endosulfan sulfate, ug/l	<10	<10	<10	<10	<10	<10
Endrin Aldehyde, ug/l	<10	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11187-6	CO-MW-N-01	Client
11187-7	CO-MW-F-01	
11187-8	CO-MW-I-01	
11187-9	CO-MW-G-01	
11187-10	CO-MW-D-01	

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
Fluorene, ug/l	<10	<10	<10	<10	<10
Heptachlor, ug/l	<10	<10	<10	<10	<10
Heptachlor epoxide, ug/l	<10	<10	<10	<10	<10
Hexachlorobenzene, ug/l	<10	<10	<10	<10	<10
Hexachlorobutadiene, ug/l	<10	<10	<10	<10	<10
Hexachloroethane, ug/l	<10	<10	<10	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l	<10	<10	<10	<10	<10
Isophorone, ug/l	<10	<10	<10	<10	<10
Naphthalene, ug/l	<10	<10	<10	<10	<10
Nitrobenzene, ug/l	<10	<10	<10	<10	<10
N-Nitrosodi-N-Propylamine, ug/l	<10	<10	<10	<10	<10
Aroclor-1016, ug/l	<100	<100	<100	<100	<100
Aroclor-1221, ug/l	<100	<100	<100	<100	<100
Aroclor-1232, ug/l	<100	<100	<100	<100	<100
Aroclor-1242, ug/l	<100	<100	<100	<100	<100
Aroclor-1248, ug/l	<100	<100	<100	<100	<100
Aroclor-1254, ug/l	<100	<100	<100	<100	<100
Aroclor-1260, ug/l	<100	<100	<100	<100	<100
Phenanthrene, ug/l	<10	<10	<10	<10	<10
Pyrene, ug/l	<10	<10	<10	<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
Toxaphene, ug/l		<200	<200	<200	<200	<200
1,2,4-Trichlorobenzene, ug/l		<10	<10	<10	<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10	<10	<10	<10
2-Chlorophenol, ug/l		<10	<10	<10	<10	<10
2,4-Dichlorophenol, ug/l		<10	<10	<10	<10	<10
2,4-Dimethylphenol, ug/l		<10	<10	<10	<10	<10
2,4-Dinitrophenol, ug/l		<50	<50	<50	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50	<50	<50	<50
2-Nitrophenol, ug/l		<10	<10	<10	<10	<10
4-Nitrophenol, ug/l		<50	<50	<50	<50	<50
Pentachlorophenol, ug/l		<50	<50	<50	<50	<50
Phenol, ug/l		<10	<10	<10	<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10	<10	<10	<10
Phosphorus Pesticides (614)						
Azinphos methyl, ug/l		<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-0, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Demeton-S, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Diazinon, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l		<0.050	<0.050	<0.050	<0.050	<0.050
Parathion Methyl, ug/l		<0.050	<0.050	<0.050	<0.050	<0.050

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11187-7	CO-MW-F-01					
11187-8	CO-MW-I-01					
11187-9	CO-MW-G-01					
11187-10	CO-MW-D-01					
PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
Chlorinated Herbicides (615)						
2,4-D, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
2,4-DB, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Dicamba, ug/l		<5.0	<5.0	<5.0	<5.0	<5.0
Dichlorprop, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Dinoseb, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	<10	<10	<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	<10	<10	<10	<10
2,4,5-T, ug/l		<0.30	<0.30	<0.30	<0.30	<0.30
2,4,5-TP Silvex, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11187-6	CO-MW-N-01					Client
11187-7	CO-MW-F-01					
11187-8	CO-MW-I-01					
11187-9	CO-MW-G-01					
11187-10	CO-MW-D-01					

PARAMETER	11187-6	11187-7	11187-8	11187-9	11187-10
<b>Chlorinated Pesticides (608)</b>					
Aldrin, ug/l	<0.10*	<0.20*	<0.20*	<0.10*	0.014
Alpha-BHC, ug/l	3.6	5.1	<0.20*	0.37	<0.010
Beta-BHC, ug/l	2.9	2.1	0.36	0.14	<0.010
Delta-BHC, ug/l	5.8	4.2	0.23	0.29	<0.010
Gamma-BHC, ug/l	0.82	0.44	<0.20*	0.18	<0.010
Chlordane, ug/l	<1.0*	<2.0*	<2.0	<1.0*	<0.10
4,4'-DDD, ug/l	0.59	3.9	1.0	<0.20*	<0.020
4,4'-DDE, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
4,4'-DDT, ug/l	<0.50*	<1.0*	<1.0*	<0.50*	<0.050
Dieldrin, ug/l	<0.20*	0.67	0.57	<0.20*	<0.020
Endosulfan I, ug/l	<0.20*	1.5	<0.40*	0.30	0.023
Endosulfan II, ug/l	<0.50*	<1.0*	<1.0*	<0.50*	<0.050
Endosulfan Sulfate, ug/l	<1.0*	<2.0*	<2.0*	<1.0*	<0.10
Endrin, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
Endrin Aldehyde, ug/l	<1.0*	<2.0*	<2.0*	<1.0*	<0.10
Heptachlor, ug/l	0.13	0.26	<0.20*	<0.10*	<0.010
Heptachlor Epoxide, ug/l	<0.20*	<0.40*	<0.40*	<0.20*	<0.020
Toxaphene, ug/l	<10*	<20*	<20*	<10*	<1.0
PCB-1016, ug/l	<5.0*	<10*	<10*	<5.0*	<0.50

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PARAMETER		11187-6	11187-7	11187-8	11187-9	11187-10
PCB-1221, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1232, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1242, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1248, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1254, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
PCB-1260, ug/l		<5.0*	<10*	<10*	<5.0*	<0.50
Arsenic, mg/l		<0.010	<0.010	<0.010	<0.010	<0.010
Chromium, mg/l		<0.010	<0.010	<0.010	0.17	0.011
Zinc, mg/l		0.042	<0.020	<0.020	0.020	0.035

\* = Increased detection limit is due to matrix interference.

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PARAMETER		11187-11	11187-12
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
601 and 602			
Bromodichloromethane, ug/l		<1.0	<100
Bromoform, ug/l		<1.0	<100
Bromomethane, ug/l		<1.0	<100
Benzene, ug/l		<1.0	<100
Carbon Tetrachloride, ug/l		<1.0	<100
Chlorobenzene, ug/l		<1.0	<100
Chloroethane, ug/l		<1.0	<100
2-Chloroethylvinyl Ether, ug/l		<1.0	<100
Chloroform, ug/l		<1.0	<100
Ethylbenzene, ug/l		<1.0	540
Chloromethane, ug/l		<1.0	<100
Dibromochloromethane, ug/l		<1.0	<100
1,2-Dichlorobenzene, ug/l		<1.0	<100
1,3-Dichlorobenzene, ug/l		<1.0	<100
1,4-Dichlorobenzene, ug/l		<1.0	<100
Dichlorodifluoromethane, ug/l		<1.0	<100
1,1-Dichloroethane, ug/l		<1.0	<100
1,2-Dichloroethane, ug/l		<1.0	<100
1,1-Dichloroethene, ug/l		<1.0	<100
cis/trans-1,2-Dichloroethylene, ug/l		<1.0	<100
1,2-Dichloropropane, ug/l		<1.0	<100
Cis-1,3-Dichloropropene, ug/l		<1.0	<100

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PARAMETER		11187-11	11187-12
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
Trans-1,3-Dichloropropene, ug/l		<1.0	<100
Methylene Chloride, ug/l		<1.0	<100
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<100
Tetrachloroethylene, ug/l		<1.0	<100
Toluene, ug/l		<1.0	<100
1,1,1-Trichloroethane, ug/l		<1.0	<100
1,1,2-Trichloroethane, ug/l		<1.0	<100
Trichloroethene, ug/l		<1.0	<100
Trichlorofluoromethane, ug/l		<1.0	<100
Vinyl Chloride, ug/l		<1.0	<100
Xylenes, ug/l		<1.0	2500

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
PARAMETER		11187-11	11187-12
BN-A Extractables (625)			
Acenaphthene, ug/l	<10	<20*	
Acenaphthylene, ug/l	<10	<20*	
Anthracene, ug/l	<10	<20*	
Aldrin, ug/l	<10	<20*	
Benzo(a)Anthracene, ug/l	<10	<20*	
Benzo(b)fluoranthene, ug/l	<10	<20*	
Benzo (k) Fluoranthene, ug/l	<10	<20*	
Benzo(a)pyrene, ug/l	<10	<20*	
Benzo(g,h,i)perylene, ug/l	<10	<20*	
Benzyl butyl phthalate, ug/l	<10	<20*	
beta-BHC, ug/l	<10	<20*	
delta-BHC, ug/l	<10	<20*	
bis(2-Chloroethyl) ether, ug/l	<10	<20*	
bis(2-Chloroethoxy) methane, ug/l	<10	<20*	
bis(2-Ethylhexyl) phthalate, ug/l	<10	<20*	
Bis(2-chloroisopropyl)ether, ug/l	<10	<20*	
4-Bromophenyl-phenyl-ether, ug/l	<10	<20*	
Chlordane, ug/l	<20	<40*	
2-Chloronaphthalene, ug/l	<10	<20*	
4-Chlorophenyl-phenyl ether, ug/l	<10	<20*	
Chrysene, ug/l	<10	<20*	
4,4'-DDD, ug/l	<10	<20*	

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PARAMETER		11187-11	11187-12
4,4'-DDE, ug/l		<10	<20*
4,4'-DDT, ug/l		<10	<20*
Dibenz (a,h)anthracene, ug/l		<10	<20*
Di-n-butylphthalate, ug/l		<10	<20*
1,3-Dichlorobenzene, ug/l		<10	<20*
1,2-Dichlorobenzene, ug/l		<10	<20*
1,4-Dichlorobenzene, ug/l		<10	<20*
3,3'-Dichlorobenzidine, ug/l		<20	<40*
Dieldrin, ug/l		<10	<20*
Diethyl Phthalate, ug/l		<10	<20*
Dimethyl phthalate, ug/l		<10	<20*
2,4-Dinitrotoluene, ug/l		<10	<20*
2,6-Dinitrotoluene, ug/l		<10	<20*
Di-n-octylphthalate, ug/l		<10	<20*
Endosulfan sulfate, ug/l		<10	<20*
Endrin Aldehyde, ug/l		<10	<20*
Fluoranthene, ug/l		<10	<20*
Fluorene, ug/l		<10	<20*
Heptachlor, ug/l		<10	<20*
Heptachlor epoxide, ug/l		<10	<20*
Hexachlorobenzene, ug/l		<10	<20*
Hexachlorobutadiene, ug/l		<10	<20*
Hexachloroethane, ug/l		<10	<20*

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PARAMETER		11187-11	11187-12
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
Indeno (1,2,3-cd)pyrene, ug/l		<10	<20*
Isophorone, ug/l		<10	<20*
Naphthalene, ug/l		<10	26
Nitrobenzene, ug/l		<10	<20*
N-Nitrosodi-N-Propylamine, ug/l		<10	<20*
Aroclor-1016, ug/l		<100	<200*
Aroclor-1221, ug/l		<100	<200*
Aroclor-1232, ug/l		<100	<200*
Aroclor-1242, ug/l		<100	<200*
Aroclor-1248, ug/l		<100	<200*
Aroclor-1254, ug/l		<100	<200*
Aroclor-1260, ug/l		<100	<200*
Phenanthrene, ug/l		<10	<20*
Pyrene, ug/l		<10	<20*
Toxaphene, ug/l		<200	<400*
1,2,4-Trichlorobenzene, ug/l		<10	<20*
4-Chloro-3-methylphenol, ug/l		<10	<20*
2-Chlorophenol, ug/l		<10	<20*
2,4-Dichlorophenol, ug/l		<10	<20*
2,4-Dimethylphenol, ug/l		<10	<20*
2,4-Dinitrophenol, ug/l		<50	<100*
2-Methyl-4,6-dinitrophenol, ug/l		<50	<100*
2-Nitrophenol, ug/l		<10	<20*
4-Nitrophenol, ug/l		<50	<100*
Pentachlorophenol, ug/l		<50	<100*
Phenol, ug/l		<10	<20*
2,4,6-Trichlorophenol, ug/l		<10	<20*

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
PARAMETER		11187-11	11187-12
Phosphorus Pesticides (614)			
Azinphos methyl, ug/l		<1.0	<1.0
Demeton-O, ug/l		<0.50	<0.50
Demeton-S, ug/l		<0.50	2.5
Diazinon, ug/l		<0.10	<0.10
Disulfoton, ug/l		<0.10	<0.10
Malathion, ug/l		<0.10	<0.10
Parathion Ethyl, ug/l		<0.050	<0.050
Parathion Methyl, ug/l		<0.050	<0.050
Chlorinated Herbicides (615)			
2,4-D, ug/l		<0.50	<0.50
2,4-DB, ug/l		<0.50	<0.50
Dicamba, ug/l		<5.0	<5.0
Dichlorprop, ug/l		<0.50	<0.50
Dinoseb, ug/l		<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	<10
2,4,5-T, ug/l		<0.30	<0.30
2,4,5-TP Silvex, ug/l		<0.10	<0.10

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PARAMETER		11187-11	11187-12
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
Chlorinated Pesticides (608)			
Aldrin, ug/l		0.014	<0.50*
Alpha-BHC, ug/l		<0.010	<0.50*
Beta-BHC, ug/l		<0.010	0.86
Delta-BHC, ug/l		<0.010	<0.50*
Gamma-BHC, ug/l		<0.010	<0.50*
Chlordane, ug/l		<0.10	<5.0*
4,4'-DDD, ug/l		<0.020	<1.0*
4,4'-DDE, ug/l		<0.020	<1.0*
4,4'-DDT, ug/l		<0.050	<2.5*
Dieldrin, ug/l		<0.020	<1.0*
Endosulfan I, ug/l		0.025	<1.0*
Endosulfan II, ug/l		<0.050	<2.5*
Endosulfan Sulfate, ug/l		<0.10	<5.0*
Endrin, ug/l		<0.020	<1.0*
Endrin Aldehyde, ug/l		<0.10	<5.0*
Heptachlor, ug/l		<0.010	<0.50*
Heptachlor Epoxide, ug/l		<0.020	<1.0*
Toxaphene, ug/l		<1.0	<50*
PCB-1016, ug/l		<0.50	<25*
PCB-1221, ug/l		<0.50	<25*
PCB-1232, ug/l		<0.50	<25*
PCB-1242, ug/l		<0.50	<25*
PCB-1248, ug/l		<0.50	<25*
PCB-1254, ug/l		<0.50	<25*
PCB-1260, ug/l		<0.50	<25*

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11187-11	11187-12
11187-11	CO-MW-D-02		Client
11187-12	CO-MW-E-01		
Arsenic, mg/l		<0.010	<0.010
Chromium, mg/l		0.011	0.015
Zinc, mg/l		0.052	0.025

\* = Increased detection limit is due to matrix  
interference.

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11187-13	11187-14	11187-15
601 and 602				
Bromodichloromethane, ug/l	<1.0	---	---	---
Bromoform, ug/l	<1.0	---	---	---
Bromomethane, ug/l	<1.0	---	---	---
Benzene, ug/l	<1.0	92 %	4.3 %	
Carbon Tetrachloride, ug/l	<1.0	---	---	
Chlorobenzene, ug/l	<1.0	88 %	0 %	
Chloroethane, ug/l	<1.0	---	---	
2-Chloroethylvinyl Ether, ug/l	<1.0	---	---	
Chloroform, ug/l	<1.0	---	---	
Ethylbenzene, ug/l	<1.0	---	---	
Chloromethane, ug/l	<1.0	---	---	
Dibromochloromethane, ug/l	<1.0	---	---	
1,2-Dichlorobenzene, ug/l	<1.0	---	---	
1,3-Dichlorobenzene, ug/l	<1.0	---	---	
1,4-Dichlorobenzene, ug/l	<1.0	---	---	
Dichlorodifluoromethane, ug/l	<1.0	---	---	
1,1-Dichloroethane, ug/l	<1.0	---	---	
1,2-Dichloroethane, ug/l	<1.0	---	---	
1,1-Dichloroethene, ug/l	<1.0	92 %	7.6 %	
cis/trans-1,2-Dichloroethylene, ug/l	<1.0	---	---	
1,2-Dichloropropane, ug/l	<1.0	---	---	

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)			
11187-15	Precision (% RPD)			
Cis-1,3-Dichloropropene, ug/l		<1.0	---	---
Trans-1,3-Dichloropropene, ug/l		<1.0	---	---
Methylene Chloride, ug/l		<1.0	---	---
1,1,2,2-Tetrachloroethane, ug/l		<1.0	---	---
Tetrachloroethylene, ug/l		<1.0	---	---
Toluene, ug/l		<1.0	97 %	4.1 %
1,1,1-Trichloroethane, ug/l		<1.0	---	---
1,1,2-Trichloroethane, ug/l		<1.0	---	---
Trichloroethene, ug/l		<1.0	75 %	0 %
Trichlorofluoromethane, ug/l		<1.0	---	---
Vinyl Chloride, ug/l		<1.0	---	---
Xylenes, ug/l		<1.0	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)			
11187-15	Precision (% RPD)			
PARAMETER		11187-13	11187-14	11187-15
BN-A Extractables (625)				
Acenaphthene, ug/l		<10	71 %	0 %
Acenaphthylene, ug/l		<10	---	---
Anthracene, ug/l		<10	---	---
Aldrin, ug/l		<10	---	---
Benzo(a)Anthracene, ug/l		<10	---	---
Benzo(b)fluoranthene, ug/l		<10	---	---
Benzo (k) Fluoranthene, ug/l		<10	---	---
Benzo(a)pyrene, ug/l		<10	---	---
Benzo(g,h,i)perylene, ug/l		<10	---	---
Benzyl butyl phthalate, ug/l		<10	---	---
beta-BHC, ug/l		<10	---	---
delta-BHC, ug/l		<10	---	---
bis(2-Chloroethyl) ether, ug/l		<10	---	---
bis(2-Chloroethoxy) methane, ug/l		<10	---	---
bis(2-Ethylhexyl) phthalate, ug/l		<10	---	---
Bis(2-chloroisopropyl)ether, ug/l		<10	---	---
4-Bromophenyl-phenyl-ether, ug/l		<10	---	---
Chlordane, ug/l		<20	---	---
2-Chloronaphthalene, ug/l		<10	---	---
4-Chlorophenyl-phenyl ether, ug/l		<10	---	---
Chrysene, ug/l		<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)			
11187-15	Precision (% RPD)			
PARAMETER		11187-13	11187-14	11187-15
4,4'-DDD, ug/l		<10	---	---
4,4'-DDE, ug/l		<10	---	---
4,4'-DDT, ug/l		<10	---	---
Dibenz (a,h)anthracene, ug/l		<10	---	---
Di-n-butylphthalate, ug/l		<10	---	---
1,3-Dichlorobenzene, ug/l		<10	---	---
1,2-Dichlorobenzene, ug/l		<10	---	---
1,4-Dichlorobenzene, ug/l		<10	69 %	0 %
3,3'-Dichlorobenzidine, ug/l		<20	---	---
Dieldrin, ug/l		<10	---	---
Diethyl Phthalate, ug/l		<10	---	---
Dimethyl phthalate, ug/l		<10	---	---
2,4-Dinitrotoluene, ug/l		<10	90 %	5.6 %
2,6-Dinitrotoluene, ug/l		<10	---	---
Di-n-octylphthalate, ug/l		<10	---	---
Endosulfan sulfate, ug/l		<10	---	---
Endrin Aldehyde, ug/l		<10	---	---
Fluoranthene, ug/l		<10	---	---
Fluorene, ug/l		<10	---	---
Heptachlor, ug/l		<10	---	---
Heptachlor epoxide, ug/l		<10	---	---
Hexachlorobenzene, ug/l		<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11187-13	11187-14	11187-15
Hexachlorobutadiene, ug/l		<10	---	---
Hexachloroethane, ug/l		<10	---	---
Indeno (1,2,3-cd)pyrene, ug/l		<10	---	---
Isophorone, ug/l		<10	---	---
Naphthalene, ug/l		<10	---	---
Nitrobenzene, ug/l		<10	---	---
N-Nitrosodi-N-Propylamine, ug/l		<10	97 %	6.2 %
Aroclor-1016, ug/l		<100	---	---
Aroclor-1221, ug/l		<100	---	---
Aroclor-1232, ug/l		<100	---	---
Aroclor-1242, ug/l		<100	---	---
Aroclor-1248, ug/l		<100	---	---
Aroclor-1254, ug/l		<100	---	---
Aroclor-1260, ug/l		<100	---	---
Phenanthrene, ug/l		<10	---	---
Pyrene, ug/l		<10	82 %	6.1 %
Toxaphene, ug/l		<200	---	---
1,2,4-Trichlorobenzene, ug/l		<10	73 %	2.7 %
4-Chloro-3-methylphenol, ug/l		<10	82 %	7.3 %
2-Chlorophenol, ug/l		<10	62 %	1.6 %
2,4-Dichlorophenol, ug/l		<10	---	---
2,4-Dimethylphenol, ug/l		<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)	<50	---	---
11187-15	Precision (% RPD)	<50	---	---
PARAMETER		11187-13	11187-14	11187-15
2,4-Dinitrophenol, ug/l		<50	---	---
2-Methyl-4,6-dinitrophenol, ug/l		<50	---	---
2-Nitrophenol, ug/l		<10	---	---
4-Nitrophenol, ug/l		<50	32 %	6.2 %
Pentachlorophenol, ug/l		<50	82 %	7.3 %
Phenol, ug/l		<10	44 %	2.3 %
2,4,6-Trichlorophenol, ug/l		<10	---	---
Phosphorus Pesticides (614)				
Azinphos methyl, ug/l		<0.10	---	---
Demeton-O, ug/l		<0.50	---	---
Demeton-S, ug/l		<0.50	---	---
Diazinon, ug/l		<0.10	---	---
Disulfoton, ug/l		<0.10	69 %	0.72 %
Malathion, ug/l		<0.10	---	---
Parathion Ethyl, ug/l		<0.050	74 %	1.3 %
Parathion Methyl, ug/l		<0.050	65 %	3.0 %

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)			
11187-15	Precision (% RPD)			
Chlorinated Herbicides (615)				
2,4-D, ug/l		<0.50	79 %	15 %
2,4-DB, ug/l		<0.50	---	---
Dicamba, ug/l		<5.0	58 %	14 %
Dichlorprop, ug/l		<0.50	80 %	25 %
Dinoseb, ug/l		<0.50	---	---
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	---	---
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	---	---
2,4,5-T, ug/l		<0.30	---	---
2,4,5-TP Silvex, ug/l		<0.10	72 %	5.6 %

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PARAMETER		11187-13	11187-14	11187-15
Chlorinated Pesticides (608)				
Aldrin, ug/l	<0.010	90 %	5.6 %	
Alpha-BHC, ug/l	<0.010	---	---	
Beta-BHC, ug/l	<0.010	---	---	
Delta-BHC, ug/l	<0.010	---	---	
Gamma-BHC, ug/l	<0.010	57 %	3.5 %	
Chlordane, ug/l	<0.10	---	---	
4,4'-DDD, ug/l	<0.020	---	---	
4,4'-DDE, ug/l	<0.020	---	---	
4,4'-DDT, ug/l	<0.050	124 %	23 %	
Dieldrin, ug/l	<0.020	---	---	
Endosulfan I, ug/l	<0.020	---	---	
Endosulfan II, ug/l	<0.050	---	---	
Endosulfan Sulfate, ug/l	<0.10	---	---	
Endrin, ug/l	<0.020	---	---	
Endrin Aldehyde, ug/l	<0.10	---	---	
Heptachlor, ug/l	<0.010	92 %	0 %	
Heptachlor Epoxide, ug/l	<0.020	---	---	
Toxaphene, ug/l	<1.0	---	---	
PCB-1016, ug/l	<0.50	---	---	
PCB-1221, ug/l	<0.50	---	---	
PCB-1232, ug/l	<0.50	---	---	
PCB-1242, ug/l	<0.50	---	---	
PCB-1248, ug/l	<0.50	---	---	
PCB-1254, ug/l	<0.50	---	---	
PCB-1260, ug/l	<0.50	---	---	

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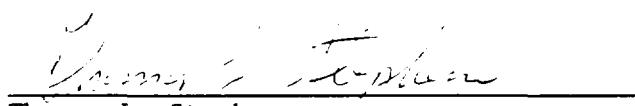
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PARAMETER		11187-13	11187-14	11187-15
11187-13	Lab Blank			Client
11187-14	Accuracy (% Recovery)			
11187-15	Precision (% RPD)			
Arsenic, mg/l		<0.010	92 %	4.3 %
Chromium, mg/l		<0.010	118 %	3.4 %
Zinc, mg/l		<0.020	99 %	7.1 %

Method: EPA 40 CFR Part 136

HRS Certification #'s:81291,87279,E81005,E87052

  
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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-1	CO-MW-H-01	Client
11605-2	CO-MW-H-02	
11605-3	CO-MW-J-01	
11605-4	CO-MW-K-01	
11605-5	CO-MW-L-01	

PARAMETER	11605-1	11605-2	11605-3	11605-4	11605-5
cis/trans-1,2-Dichloroethyl ene, ug/l	<25	<25	<50	<5.0	<100
1,2-Dichloropropane, ug/l	<25	<25	<50	<5.0	<100
Cis-1,3-Dichloropropene, ug/l	<25	<25	<50	<5.0	<100
Trans-1,3-Dichloropropene, ug/l	<25	<25	<50	<5.0	<100
Methylene Chloride, ug/l	290	68	90	<5.0	<100
1,1,2,2-Tetrachloroethane, ug/l	<25	<25	<50	<5.0	<100
Tetrachloroethylene, ug/l	<25	<25	<50	<5.0	<100
Toluene, ug/l	76	54	88	<5.0	<100
1,1,1-Trichloroethane, ug/l	<25	<25	<50	<5.0	<100
1,1,2-Trichloroethane, ug/l	220	39	<50	<5.0	<100
Trichloroethene, ug/l	<25	<25	<50	<5.0	<100
Trichlorofluoromethane, ug/l	<25	<25	<50	<5.0	<100
Vinyl Chloride, ug/l	<25	<25	<50	<5.0	<100
Xylenes, ug/l	1300	640	750	89	5500

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
N-A Extractables (625)						
Acenaphthene, ug/l		<40	<40	<40	<10	<40
Acenaphthylene, ug/l		<40	<40	<40	<10	<40
Anthracene, ug/l		<40	<40	<40	<10	<40
Aldrin, ug/l		<40	<40	<40	<10	<40
Benzo(a)Anthracene, ug/l		<40	<40	<40	<10	<40
Benzo(b)fluoranthene, ug/l		<40	<40	<40	<10	<40
Benzo (k) Fluoranthene, ug/l		<40	<40	<40	<10	<40
Benzo(a)pyrene, ug/l		<40	<40	<40	<10	<40
Benzo(g,h,i)perylene, ug/l		<40	<40	<40	<10	<40
Benzyl butyl phthalate, ug/l		<40	<40	<40	<10	<40
beta-BHC, ug/l		<40	<40	<40	<10	<40
delta-BHC, ug/l		<40	<40	<40	<10	<40
bis(2-Chloroethyl) ether, ug/l		<40	<40	<40	<10	<40
bis(2-Chloroethoxy) methane, ug/l		<40	<40	<40	<10	<40
bis(2-Ethylhexyl) phthalate, ug/l		<40	<40	<40	<10	<40
Bis(2-chloroisopropyl)ether, ug/l		<40	<40	<40	<10	<40
4-Bromophenyl-phenyl-ether, ug/l		<40	<40	<40	<10	<40
Chlordane, ug/l		<80	<80	<80	<20	<80
2-Chloronaphthalene, ug/l		<40	<40	<40	<10	<40

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
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11605-2	CO-MW-H-02					
11605-3	CO-MW-J-01					
11605-4	CO-MW-K-01					
11605-5	CO-MW-L-01					
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
4-Chlorophenyl-phenyl ether, ug/l	<40	<40	<40	<10	<40	
Chrysene, ug/l	<40	<40	<40	<10	<40	
4,4'-DDD, ug/l	<40	<40	<40	<10	<40	
4,4'-DDE, ug/l	<40	<40	<40	<10	<40	
4,4'-DDT, ug/l	<40	<40	<40	<10	<40	
Dibenz (a,h)anthracene, ug/l	<40	<40	<40	<10	<40	
Di-n-butylphthalate, ug/l	<40	<40	<40	<10	<40	
1,3-Dichlorobenzene, ug/l	<40	<40	<40	<10	<40	
1,2-Dichlorobenzene, ug/l	<40	<40	<40	<10	<40	
1,4-Dichlorobenzene, ug/l	49	51	<40	<10	49	
3,3'-Dichlorobenzidine, ug/l	<80	<80	<80	<20	<80	
Dieldrin, ug/l	<40	<40	<40	<10	<40	
Diethyl Phthalate, ug/l	<40	<40	<40	<10	<40	
Dimethyl phthalate, ug/l	<40	<40	<40	<10	<40	
2,4-Dinitrotoluene, ug/l	<40	<40	<40	<10	<40	
2,6-Dinitrotoluene, ug/l	<40	<40	<40	<10	<40	
Di-n-octylphthalate, ug/l	<40	<40	<40	<10	<40	
Endosulfan sulfate, ug/l	<40	<40	<40	<10	<40	
Endrin Aldehyde, ug/l	<40	<40	<40	<10	<40	
Fluoranthene, ug/l	<40	<40	<40	<10	<40	

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
Fluorene, ug/l		<40	<40	<40	<10	<40
Heptachlor, ug/l		<40	<40	<40	<10	<40
Heptachlor epoxide, ug/l		<40	<40	<40	<10	<40
Hexachlorobenzene, ug/l		<40	<40	<40	<10	<40
Hexachlorobutadiene, ug/l		<40	<40	<40	<10	<40
Hexachloroethane, ug/l		<40	<40	<40	<10	<40
Indeno (1,2,3-cd)pyrene, ug/l		<40	<40	<40	<10	<40
Isophorone, ug/l		56	55	44	<10	56
Naphthalene, ug/l		<40	<40	<40	<10	<40
Nitrobenzene, ug/l		<40	<40	<40	<10	<40
N-Nitrosodi-N-Propylamine, ug/l		<40	<40	<40	<10	<40
Aroclor-1016, ug/l		<400	<400	<400	<100	<400
Aroclor-1221, ug/l		<400	<400	<400	<100	<400
Aroclor-1232, ug/l		<400	<400	<400	<100	<400
Aroclor-1242, ug/l		<400	<400	<400	<100	<400
Aroclor-1248, ug/l		<400	<400	<400	<100	<400
Aroclor-1254, ug/l		<400	<400	<400	<100	<400
Aroclor-1260, ug/l		<400	<400	<400	<100	<400
Phenanthrene, ug/l		<40	<40	<40	<10	<40
Pyrene, ug/l		<40	<40	<40	<10	<40

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11605-2	CO-MW-H-02					
11605-3	CO-MW-J-01					
11605-4	CO-MW-K-01					
11605-5	CO-MW-L-01					
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
Toxaphene, ug/l		<800	<800	<800	<200	<800
1,2,4-Trichlorobenzene, ug/l		<40	<40	<40	<10	<40
4-Chloro-3-methylphenol, ug/l		<40	<40	<40	<10	<40
2-Chlorophenol, ug/l		<40	<40	<40	<10	<40
2,4-Dichlorophenol, ug/l		<40	<40	<40	<10	<40
2,4-Dimethylphenol, ug/l		<40	47	<40	<10	<40
2,4-Dinitrophenol, ug/l		<200	<200	<200	<50	<200
2-Methyl-4,6-dinitrophenol, ug/l		<200	<200	<200	<50	<200
2-Nitrophenol, ug/l		<40	<40	<40	<10	<40
4-Nitrophenol, ug/l		<200	<200	<200	<50	<200
Pentachlorophenol, ug/l		<200	<200	<200	<50	<200
Phenol, ug/l		46	46	<40	<10	46
2,4,6-Trichlorophenol, ug/l		<40	<40	<40	<10	<40
Phosphorus Pesticides (614)						
Azinphos methyl, ug/l		<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-O, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Demeton-S, ug/l		130	22	46	<0.50	21
Diazinon, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l		<0.050	<0.050	<0.050	<0.050	<0.050
Parathion Methyl, ug/l		<0.050	<0.050	<0.050	<0.050	<0.050

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11605-2	CO-MW-H-02					
11605-3	CO-MW-J-01					
11605-4	CO-MW-K-01					
11605-5	CO-MW-L-01					
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
<b>Chlorinated Herbicides (615)</b>						
2,4-D, ug/l		<10*	<40*	<25*	<0.50	<50*
2,4-DB, ug/l		<10*	<40*	<25*	<0.50	<50*
Dicamba, ug/l		<100*	<400*	<250*	<5.0	<500*
Dichlorprop, ug/l		<10*	<40*	<25*	<0.50	<50*
Dinoseb, ug/l		<10*	<40*	<25*	<0.50	<50*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<200*	<800*	<500*	<10	<1000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<200*	<800*	<500*	<10	<1000*
2,4,5-T, ug/l		<6.0*	<24*	<15*	<0.30	<30*
2,4,5-TP Silvex, ug/l		<2.0*	<8.0*	<5.0*	<0.10	<10*

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
Chlorinated Pesticides (608)						
Aldrin, ug/l	<0.50*	<0.50*	<0.50*	<0.20*	1.7	
Alpha-BHC, ug/l	2.4	2.8	15	<0.20*	2.1	
Beta-BHC, ug/l	7.7	8.2	7.1	<0.20*	1.4	
Delta-BHC, ug/l	<0.50*	<0.50*	11	<0.20*	<0.20*	
Gamma-BHC, ug/l	1.7	1.7	18	<0.20*	0.67	
Chlordane, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*	
4,4'-DDD, ug/l	2.6	5.5	4.6	<0.40*	<0.40*	
4,4'-DDE, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*	
4,4'-DDT, ug/l	<2.5*	<2.5*	<2.5*	<1.0*	<1.0*	
Dieldrin, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*	
Endosulfan I, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*	
Endosulfan II, ug/l	<2.5*	<2.5*	<2.5*	<1.0*	<1.0*	
Endosulfan Sulfate, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*	
Endrin, ug/l	<1.0*	1.5	1.1	<0.40*	<0.40*	
Endrin Aldehyde, ug/l	<5.0*	<5.0*	<5.0*	<2.0*	<2.0*	
Heptachlor, ug/l	<0.50*	<0.50*	<0.50*	<0.20*	<0.20*	
Heptachlor Epoxide, ug/l	<1.0*	<1.0*	<1.0*	<0.40*	<0.40*	
Toxaphene, ug/l	<50*	<50*	<50*	<20*	<20*	
PCB-1016, ug/l	<25*	<25*	<25*	<10*	<10*	

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11605-1	CO-MW-H-01				Client	
11605-2	CO-MW-H-02					
11605-3	CO-MW-J-01					
11605-4	CO-MW-K-01					
11605-5	CO-MW-L-01					
PARAMETER		11605-1	11605-2	11605-3	11605-4	11605-5
PCB-1221, ug/l		<25*	<25*	<25*	<10*	<10*
PCB-1232, ug/l		<25*	<25*	<25*	<10*	<10*
PCB-1242, ug/l		<25*	<25*	<25*	<10*	<10*
PCB-1248, ug/l		<25*	<25*	<25*	<10*	<10*
PCB-1254, ug/l		<25*	<25*	<25*	<10*	<10*
PCB-1260, ug/l		<25*	<25*	<25*	<10*	<10*
Arsenic, mg/l	0.030	0.092	0.025	<0.010	0.082	
Chromium, mg/l	0.011	0.051	0.031	<0.010	0.038	
Zinc, mg/l	<0.020	0.027	0.041	0.024	<0.020	

\* = Increased detection limit due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
601 and 602			
Bromodichloromethane, ug/l		<1.0	<1.0
Bromoform, ug/l		<1.0	<1.0
Bromomethane, ug/l		<1.0	<1.0
Benzene, ug/l		<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<1.0
Chloroethane, ug/l		<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0
Chloroform, ug/l		<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<1.0
Chloromethane, ug/l		<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0
1,4-Dichlorobenzene, ug/l		<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0
1,1-Dichloroethene, ug/l		<1.0	<1.0
cis/trans-1,2-Dichloroethylene, ug/l		<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
11605-6	Field Blank		Client
11605-7	Equipment Blank		
Trans-1,3-Dichloropropene, ug/l		<1.0	<1.0
Methylene Chloride, ug/l		<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<1.0
Tetrachloroethylene, ug/l		<1.0	<1.0
Toluene, ug/l		<1.0	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<1.0
Trichloroethene, ug/l		<1.0	<1.0
Trichlorofluoromethane, ug/l		<1.0	<1.0
Vinyl Chloride, ug/l		<1.0	<1.0
Xylenes, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
BN-A Extractables (625)			
Acenaphthene, ug/l		<10	<10
Acenaphthylene, ug/l		<10	<10
Anthracene, ug/l		<10	<10
Aldrin, ug/l		<10	<10
Benzo(a)Anthracene, ug/l		<10	<10
Benzo(b)fluoranthene, ug/l		<10	<10
Benzo (k) Fluoranthene, ug/l		<10	<10
Benzo(a)pyrene, ug/l		<10	<10
Benzo(g,h,i)perylene, ug/l		<10	<10
Benzyl butyl phthalate, ug/l		<10	<10
beta-BHC, ug/l		<10	<10
delta-BHC, ug/l		<10	<10
bis(2-Chloroethyl) ether, ug/l		<10	<10
bis(2-Chloroethoxy) methane, ug/l		<10	<10
bis(2-Ethylhexyl) phthalate, ug/l		<10	<10
Bis(2-chloroisopropyl)ether, ug/l		<10	<10
4-Bromophenyl-phenyl-ether, ug/l		<10	<10
Chlordane, ug/l		<20	<20
2-Chloronaphthalene, ug/l		<10	<10
4-Chlorophenyl-phenyl ether, ug/l		<10	<10
Chrysene, ug/l		<10	<10
4,4'-DDD, ug/l		<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
11605-6	Field Blank		Client
11605-7	Equipment Blank		
4,4'-DDE, ug/l		<10	<10
4,4'-DDT, ug/l		<10	<10
Dibenz (a,h)anthracene, ug/l		<10	<10
Di-n-butylphthalate, ug/l		<10	<10
1,3-Dichlorobenzene, ug/l		<10	<10
1,2-Dichlorobenzene, ug/l		<10	<10
1,4-Dichlorobenzene, ug/l		<10	<10
3,3'-Dichlorobenzidine, ug/l		<20	<20
Dieldrin, ug/l		<10	<10
Diethyl Phthalate, ug/l		<10	<10
Dimethyl phthalate, ug/l		<10	<10
2,4-Dinitrotoluene, ug/l		<10	<10
2,6-Dinitrotoluene, ug/l		<10	<10
Di-n-octylphthalate, ug/l		<10	<10
Endosulfan sulfate, ug/l		<10	<10
Endrin Aldehyde, ug/l		<10	<10
Fluoranthene, ug/l		<10	<10
Fluorene, ug/l		<10	<10
Heptachlor, ug/l		<10	<10
Heptachlor epoxide, ug/l		<10	<10
Hexachlorobenzene, ug/l		<10	<10
Hexachlorobutadiene, ug/l		<10	<10
Hexachloroethane, ug/l		<10	<10



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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
11605-6	Field Blank		Client
11605-7	Equipment Blank		
Indeno (1,2,3-cd)pyrene, ug/l		<10	<10
Isophorone, ug/l		<10	<10
Naphthalene, ug/l		<10	<10
Nitrobenzene, ug/l		<10	<10
N-Nitrosodi-N-Propylamine, ug/l		<10	<10
Aroclor-1016, ug/l		<100	<100
Aroclor-1221, ug/l		<100	<100
Aroclor-1232, ug/l		<100	<100
Aroclor-1242, ug/l		<100	<100
Aroclor-1248, ug/l		<100	<100
Aroclor-1254, ug/l		<100	<100
Aroclor-1260, ug/l		<100	<100
Phenanthrene, ug/l		<10	<10
Pyrene, ug/l		<10	<10
Toxaphene, ug/l		<200	<200
1,2,4-Trichlorobenzene, ug/l		<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10
2-Chlorophenol, ug/l		<10	<10
2,4-Dichlorophenol, ug/l		<10	<10
2,4-Dimethylphenol, ug/l		<10	<10
2,4-Dinitrophenol, ug/l		<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50
2-Nitrophenol, ug/l		<10	<10
4-Nitrophenol, ug/l		<50	<50
Pentachlorophenol, ug/l		<50	<50
Phenol, ug/l		<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
11605-6	Field Blank		Client
11605-7	Equipment Blank		
Phosphorus Pesticides (614)			
Azinphos methyl, ug/l		<1.0	<1.0
Demeton-O, ug/l		<0.50	<0.50
Demeton-S, ug/l		<0.50	<0.50
Diazinon, ug/l		<0.10	<0.10
Disulfoton, ug/l		<0.10	<0.10
Malathion, ug/l		<0.10	<0.10
Parathion Ethyl, ug/l		<0.050	<0.050
Parathion Methyl, ug/l		<0.050	<0.050
Chlorinated Herbicides (615)			
2,4-D, ug/l		<0.50	<0.50
2,4-DB, ug/l		<0.50	<0.50
Dicamba, ug/l		<5.0	<5.0
Dichlorprop, ug/l		<0.50	<0.50
Dinoseb, ug/l		<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	<10
2,4,5-T, ug/l		<0.30	<0.30
2,4,5-TP Silvex, ug/l		<0.10	<0.10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
Chlorinated Pesticides (608)			
Aldrin, ug/l		<0.010	<0.010
Alpha-BHC, ug/l		<0.010	<0.010
Beta-BHC, ug/l		<0.010	<0.010
Delta-BHC, ug/l		<0.010	<0.010
Gamma-BHC, ug/l		<0.010	<0.010
Chlordane, ug/l		<0.10	<0.10
4,4'-DDD, ug/l		<0.020	<0.020
4,4'-DDE, ug/l		<0.020	<0.020
4,4'-DDT, ug/l		<0.050	<0.050
Dieldrin, ug/l		<0.020	<0.020
Endosulfan I, ug/l		<0.020	<0.020
Endosulfan II, ug/l		<0.050	<0.050
Endosulfan Sulfate, ug/l		<0.10	<0.10
Endrin, ug/l		<0.020	<0.020
Endrin Aldehyde, ug/l		<0.10	<0.10
Heptachlor, ug/l		<0.010	<0.010
Heptachlor Epoxide, ug/l		<0.020	<0.020
Toxaphene, ug/l		<1.0	<1.0
PCB-1016, ug/l		<0.50	<0.50
PCB-1221, ug/l		<0.50	<0.50
PCB-1232, ug/l		<0.50	<0.50
PCB-1242, ug/l		<0.50	<0.50
PCB-1248, ug/l		<0.50	<0.50
PCB-1254, ug/l		<0.50	<0.50
PCB-1260, ug/l		<0.50	<0.50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-6	11605-7
11605-6	Field Blank		Client
11605-7	Equipment Blank		
Arsenic, mg/l		<0.010	<0.010
Chromium, mg/l		<0.010	<0.010
Zinc, mg/l		<0.020	<0.020

\* = Increased detection limit due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11605-8	11605-9
11605-8	Trip Blank #1		Client
11605-9	Trip Blank #2		
601 and 602			
Bromodichloromethane, ug/l		<1.0	<1.0
Bromoform, ug/l		<1.0	<1.0
Bromomethane, ug/l		<1.0	<1.0
Benzene, ug/l		<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<1.0
Chloroethane, ug/l		<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0
Chloroform, ug/l		<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<1.0
Chloromethane, ug/l		<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0
1,4-Dichlorobenzene, ug/l		<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0
1,1-Dichloroethene, ug/l		<1.0	<1.0
cis/trans-1,2-Dichloroethylene, ug/l		<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11605-8	Trip Blank #1	Client
11605-9	Trip Blank #2	
PARAMETER		11605-8      11605-9
Trans-1,3-Dichloropropene, ug/l		<1.0      <1.0
Methylene Chloride, ug/l		<1.0      <1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0      <1.0
Tetrachloroethylene, ug/l		<1.0      <1.0
Toluene, ug/l		<1.0      <1.0
1,1,1-Trichloroethane, ug/l		<1.0      <1.0
1,1,2-Trichloroethane, ug/l		<1.0      <1.0
Trichloroethene, ug/l		<1.0      <1.0
Trichlorofluoromethane, ug/l		<1.0      <1.0
Vinyl Chloride, ug/l		<1.0      <1.0
Xylenes, ug/l		<1.0      <1.0

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
601 and 602				
Bromodichloromethane, ug/l		<1.0	---	---
Bromoform, ug/l		<1.0	---	---
Bromomethane, ug/l		<1.0	---	---
Benzene, ug/l		<1.0	82 %	1.2 %
Carbon Tetrachloride, ug/l		<1.0	---	---
Chlorobenzene, ug/l		<1.0	100 %	4.0 %
Chloroethane, ug/l		<1.0	---	---
2-Chloroethylvinyl Ether, ug/l		<1.0	---	---
Chloroform, ug/l		<1.0	---	---
Ethylbenzene, ug/l		<1.0	---	---
Chloromethane, ug/l		<1.0	---	---
Dibromochloromethane, ug/l		<1.0	---	---
1,2-Dichlorobenzene, ug/l		<1.0	---	---
1,3-Dichlorobenzene, ug/l		<1.0	---	---
1,4-Dichlorobenzene, ug/l		<1.0	---	---
Dichlorodifluoromethane, ug/l		<1.0	---	---
1,1-Dichloroethane, ug/l		<1.0	---	---
1,2-Dichloroethane, ug/l		<1.0	---	---
1,1-Dichloroethene, ug/l		<1.0	86 %	9.3 %
cis/trans-1,2-Dichloroethylene, ug/l		<1.0	---	---
1,2-Dichloropropane, ug/l		<1.0	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
Cis-1,3-Dichloropropene, ug/l		<1.0	---	---
Trans-1,3-Dichloropropene, ug/l		<1.0	---	---
Methylene Chloride, ug/l		<1.0	---	---
1,1,2,2-Tetrachloroethane, ug/l		<1.0	---	---
Tetrachloroethylene, ug/l		<1.0	---	---
Toluene, ug/l		<1.0	90 %	1.1 %
1,1,1-Trichloroethane, ug/l		<1.0	---	---
1,1,2-Trichloroethane, ug/l		<1.0	---	---
Trichloroethene, ug/l		<1.0	77 %	3.9 %
Trichlorofluoromethane, ug/l		<1.0	---	---
Vinyl Chloride, ug/l		<1.0	---	---
Xylenes, ug/l		<1.0	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
BN-A Extractables (625)				
Acenaphthene, ug/l		<10	71 %	0 %
Acenaphthylene, ug/l		<10	---	---
Anthracene, ug/l		<10	---	---
Aldrin, ug/l		<10	---	---
Benzo(a)Anthracene, ug/l		<10	---	---
Benzo(b)fluoranthene, ug/l		<10	---	---
Benzo (k) Fluoranthene, ug/l		<10	---	---
Benzo(a)pyrene, ug/l		<10	---	---
Benzo(g,h,i)perylene, ug/l		<10	---	---
Benzyl butyl phthalate, ug/l		<10	---	---
beta-BHC, ug/l		<10	---	---
delta-BHC, ug/l		<10	---	---
bis(2-Chloroethyl) ether, ug/l		<10	---	---
bis(2-Chloroethoxy) methane, ug/l		<10	---	---
bis(2-Ethylhexyl) phthalate, ug/l		<10	---	---
Bis(2-chloroisopropyl)ether, ug/l		<10	---	---
4-Bromophenyl-phenyl-ether, ug/l		<10	---	---
Chlordane, ug/l		<20	---	---
2-Chloronaphthalene, ug/l		<10	---	---
4-Chlorophenyl-phenyl ether, ug/l		<10	---	---
Chrysene, ug/l		<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
4,4'-DDD, ug/l		<10	---	---
4,4'-DDE, ug/l		<10	---	---
4,4'-DDT, ug/l		<10	---	---
Dibenz (a,h)anthracene, ug/l		<10	---	---
Di-n-butylphthalate, ug/l		<10	---	---
1,3-Dichlorobenzene, ug/l		<10	---	---
1,2-Dichlorobenzene, ug/l		<10	---	---
1,4-Dichlorobenzene, ug/l		<10	69 %	0 %
3,3'-Dichlorobenzidine, ug/l		<20	---	---
Dieldrin, ug/l		<10	---	---
Diethyl Phthalate, ug/l		<10	---	---
Dimethyl phthalate, ug/l		<10	---	---
2,4-Dinitrotoluene, ug/l		<10	90 %	5.6 %
2,6-Dinitrotoluene, ug/l		<10	---	---
Di-n-octylphthalate, ug/l		<10	---	---
Endosulfan sulfate, ug/l		<10	---	---
Endrin Aldehyde, ug/l		<10	---	---
Fluoranthene, ug/l		<10	---	---
Fluorene, ug/l		<10	---	---
Heptachlor, ug/l		<10	---	---
Heptachlor epoxide, ug/l		<10	---	---
Hexachlorobenzene, ug/l		<10	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
Hexachlorobutadiene, ug/l		<10	---	---
Hexachloroethane, ug/l		<10	---	---
Indeno (1,2,3-cd)pyrene, ug/l		<10	---	---
Isophorone, ug/l		<10	---	---
Naphthalene, ug/l		<10	---	---
Nitrobenzene, ug/l		<10	---	---
N-Nitrosodi-N-Propylamine, ug/l		<10	97 %	6.2 %
Aroclor-1016, ug/l		<100	---	---
Aroclor-1221, ug/l		<100	---	---
Aroclor-1232, ug/l		<100	---	---
Aroclor-1242, ug/l		<100	---	---
Aroclor-1248, ug/l		<100	---	---
Aroclor-1254, ug/l		<100	---	---
Aroclor-1260, ug/l		<100	---	---
Phenanthrene, ug/l		<10	---	---
Pyrene, ug/l		<10	82 %	6.1 %
Toxaphene, ug/l		<200	---	---
1,2,4-Trichlorobenzene, ug/l		<10	73 %	2.7 %
4-Chloro-3-methylphenol, ug/l		<10	82 %	7.3 %
2-Chlorophenol, ug/l		<10	62 %	1.6 %
2,4-Dichlorophenol, ug/l		<10	---	---
2,4-Dimethylphenol, ug/l		<10	---	---

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11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
PARAMETER		11605-10	11605-11	11605-12
2,4-Dinitrophenol, ug/l		<50	---	---
2-Methyl-4,6-dinitrophenol, ug/l		<50	---	---
2-Nitrophenol, ug/l		<10	---	---
4-Nitrophenol, ug/l		<50	32 %	6.2 %
Pentachlorophenol, ug/l		<50	82 %	7.3 %
Phenol, ug/l		<10	44 %	2.3 %
2,4,6-Trichlorophenol, ug/l		<10	---	---
Phosphorus Pesticides (614)				
Azinphos methyl, ug/l		<1.0	---	---
Demeton-O, ug/l		<0.50	---	---
Demeton-S, ug/l		<0.50	---	---
Diazinon, ug/l		<0.10	99 %	2.0 %
Disulfoton, ug/l		<0.10	---	---
Malathion, ug/l		<0.10	82 %	10 %
Parathion Ethyl, ug/l		<0.050	107 %	93 %
Parathion Methyl, ug/l		<0.050	---	---

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
<hr/>				
Chlorinated Herbicides (615)				
	2,4-D, ug/l	<0.50	79 %	15 %
	2,4-DB, ug/l	<0.50	---	---
	Dicamba, ug/l	<5.0	58 %	14 %
	Dichlorprop, ug/l	<0.50	80 %	25 %
	Dinoseb, ug/l	<0.50	---	---
	(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	---	---
	2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	---	---
	2,4,5-T, ug/l	<0.30	---	---
	2,4,5-TP Silvex, ug/l	<0.10	72 %	5.6 %
<hr/>				

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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
Chlorinated Pesticides (608)				
Aldrin, ug/l	<0.010	83 %	1.2 %	
Alpha-BHC, ug/l	<0.010	---	---	
Beta-BHC, ug/l	<0.010	---	---	
Delta-BHC, ug/l	<0.010	---	---	
Gamma-BHC, ug/l	<0.010	---	---	
Chlordane, ug/l	<0.10	---	---	
4,4'-DDD, ug/l	<0.020	---	---	
4,4'-DDE, ug/l	<0.020	---	---	
4,4'-DDT, ug/l	<0.050	68 %	0 %	
Dieldrin, ug/l	<0.020	62 %	0 %	
Endosulfan I, ug/l	<0.020	---	---	
Endosulfan II, ug/l	<0.050	---	---	
Endosulfan Sulfate, ug/l	<0.10	---	---	
Endrin, ug/l	<0.020	91 %	0 %	
Endrin Aldehyde, ug/l	<0.10	---	---	
Heptachlor, ug/l	<0.010	84 %	2.3 %	
Heptachlor Epoxide, ug/l	<0.020	---	---	
Toxaphene, ug/l	<1.0	---	---	
PCB-1016, ug/l	<0.50	---	---	
PCB-1221, ug/l	<0.50	---	---	
PCB-1232, ug/l	<0.50	---	---	
PCB-1242, ug/l	<0.50	---	---	
PCB-1248, ug/l	<0.50	---	---	
PCB-1254, ug/l	<0.50	---	---	
PCB-1260, ug/l	<0.50	---	---	

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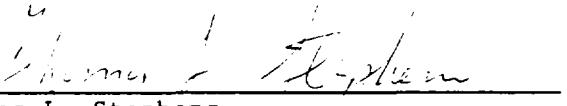
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LOG NO	SAMPLE DESCRIPTION , REPORT FOR LIQUID SAMPLES	SAMPLED BY		
PARAMETER		11605-10	11605-11	11605-12
11605-10	Lab Blank			Client
11605-11	Accuracy (% Recovery)			
11605-12	Precision (% RPD)			
Arsenic, mg/l		<0.010	114 %	4.3 %
Chromium, mg/l		<0.010	94 %	2.1 %
Zinc, mg/l		<0.020	100 %	2.0 %

Method: EPA 40 CFR Part 136

HRS Certification #'s:81291,87279,E81005,E87052

  
Thomas L. Stephens

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client
PARAMETER		11612-1
<b>Volatile Organics</b>		
Benzyl chloride, ug/kg dw		
bis(2-Chloroethoxy) methane, ug/kg dw		
Bis(2-chloroisopropyl)ether, ug/kg dw		
Bromobenzene, ug/kg dw		
Bromodichloromethane, ug/kg dw		
Benzene, ug/kg dw		
Bromoform, ug/kg dw		
Bromomethane, ug/kg dw		
Carbon Tetrachloride, ug/kg dw		
Chloroacetaldehyde, ug/kg dw		
Chlorobenzene, ug/kg dw		
Chloroethane, ug/kg dw		
Chloroform, ug/kg dw		
1-Chlorohexane, ug/kg dw		
2-Chloroethylvinyl Ether, ug/kg dw		
Chloromethane, ug/kg dw		
Chloromethyl methyl ether, ug/kg dw		
Chlorotoluene, ug/kg dw		
Dibromochloromethane, ug/kg dw		
Dibromomethane, ug/kg dw		
1,2-Dichlorobenzene, ug/kg dw		
1,3-Dichlorobenzene, ug/kg dw		
1,4-Dichlorobenzene, ug/kg dw		

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client
PARAMETER		
Dichlorodifluoromethane, ug/kg dw	<6.1	
1,1-Dichloroethane, ug/kg dw	<6.1	
1,2-Dichloroethane, ug/kg dw	<6.1	
1,1-Dichloroethene, ug/kg dw	<6.1	
1,2-Dichloropropane, ug/kg dw	<6.1	
1,3-Dichloropropylene, ug/kg dw	<6.1	
Ethylbenzene, ug/kg dw	<6.1	
Methylene Chloride, ug/kg dw	<6.1	
1,1,2,2-Tetrachloroethane, ug/kg dw	<6.1	
1,1,1,2-Tetrachloroethane, ug/kg dw	<6.1	
Tetrachloroethylene, ug/kg dw	<6.1	
Toluene, ug/kg dw	<6.1	
1,1,1-Trichloroethane, ug/kg dw	<6.1	
1,1,2-Trichloroethane, ug/kg dw	<6.1	
Trichloroethene, ug/kg dw	<6.1	
Trichlorodifluoromethane, ug/kg dw	<6.1	
Trichloropropene, ug/kg dw	<6.1	
Vinyl Chloride, ug/kg dw	<6.1	
Xylenes, ug/kg dw	<6.1	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client
PARAMETER		11612-1
<b>Organophosphorus Pesticides</b>		
Azinphos methyl, ug/kg dw		<180
Bolstar (Sulprofos), ug/kg dw		<9.2
Chlorpyrifos, ug/kg dw		<1.9
Coumaphos, ug/kg dw		<92
Demeton-O, ug/kg dw		<19
Demeton-S, ug/kg dw		<19
Diazinon, ug/kg dw		<9.2
Dichlorvos, ug/kg dw		<19
Disulfoton, ug/kg dw		<9.2
Ethoprop, ug/kg dw		<1.9
Fensulfothion, ug/kg dw		<92
Fenthion, ug/kg dw		<1.9
Merphos, ug/kg dw		<9.2
Mevinphos, ug/kg dw		<1.9
Naled, ug/kg dw		<19
Methyl Parathion, ug/kg dw		<9.2
Phorate, ug/kg dw		<1.9
Ronnel, ug/kg dw		<1.9
Stirophos (Tetrachlorvinphos), ug/kg dw		<9.2
Tokuthion (Prothiofos), ug/kg dw		<9.2
Trichloronate, ug/kg dw		<92

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11612-1	CO-SS-NB-01	Client
PARAMETER		11612-1
Chlorinated Herbicides (8150)		
2,4-D, ug/kg dw	<120	
2,4-DB, ug/kg dw	<120	
2,4,5-T, ug/kg dw	<72	
2,4,5-TP Silvex, ug/kg dw	24	
Dalapon, ug/kg dw	<2400	
Dicamba, ug/kg dw	<1200	
Dichlorprop, ug/kg dw	<120	
Dinoseb, ug/kg dw	<120	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<2400	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<2400	
Arsenic, mg/kg dw	<0.82	
Chromium, mg/kg dw	4.9	
Zinc, mg/kg dw	4.1	

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY		
PARAMETER		11612-2	11612-3	11612-4
11612-2	Lab Blank			Client
11612-3	Accuracy (% Recovery)			
11612-4	Precision (% RPD)			
Volatile Organics				
Benzyl chloride, ug/kg dw		<6.6	---	---
bis(2-Chloroethoxy) methane, ug/kg dw		<6.6	---	---
Bis(2-chloroisopropyl)ether, ug/kg dw		<6.6	---	---
Bromobenzene, ug/kg dw		<6.6	---	---
Bromodichloromethane, ug/kg dw		<6.6	---	---
Benzene, ug/kg dw		<6.6	105 %	5.7 %
Bromoform, ug/kg dw		<6.6	---	---
Bromomethane, ug/kg dw		<6.6	---	---
Carbon Tetrachloride, ug/kg dw		<6.6	---	---
Chloroacetaldehyde, ug/kg dw		<6.6	---	---
Chlorobenzene, ug/kg dw		<6.6	105 %	6.7 %
Chloroethane, ug/kg dw		<6.6	---	---
Chloroform, ug/kg dw		<6.6	---	---
1-Chlorohexane, ug/kg dw		<6.6	---	---
2-Chloroethylvinyl Ether, ug/kg dw		<6.6	---	---
Chloromethane, ug/kg dw		<6.6	---	---
Chloromethyl methyl ether, ug/kg dw		<6.6	---	---
Chlorotoluene, ug/kg dw		<6.6	---	---
Dibromochloromethane, ug/kg dw		<6.6	---	---
Dibromomethane, ug/kg dw		<6.6	---	---
1,2-Dichlorobenzene, ug/kg dw		<6.6	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY		
PARAMETER		11612-2	11612-3	11612-4
11612-2	Lab Blank			Client
11612-3	Accuracy (% Recovery)			
11612-4	Precision (% RPD)			
1,3-Dichlorobenzene, ug/kg dw		<6.6	---	---
1,4-Dichlorobenzene, ug/kg dw		<6.6	---	---
Dichlorodifluoromethane, ug/kg dw		<6.6	---	---
1,1-Dichloroethane, ug/kg dw		<6.6	---	---
1,2-Dichloroethane, ug/kg dw		<6.6	---	---
1,1-Dichloroethene, ug/kg dw		<6.6	68 %	26 %
1,2-Dichloropropane, ug/kg dw		<6.6	---	---
1,3-Dichloropropylene, ug/kg dw		<6.6	---	---
Ethylbenzene, ug/kg dw		<6.6	---	---
Methylene Chloride, ug/kg dw		<6.6	---	---
1,1,2,2-Tetrachloroethane, ug/kg dw		<6.6	---	---
1,1,1,2-Tetrachloroethane, ug/kg dw		<6.6	---	---
Tetrachloroethylene, ug/kg dw		<6.6	---	---
Toluene, ug/kg dw		<6.6	85 %	2.4 %
1,1,1-Trichloroethane, ug/kg dw		<6.6	---	---
1,1,2-Trichloroethane, ug/kg dw		<6.6	---	---
Trichloroethene, ug/kg dw		<6.6	98 %	3.1 %
Trichlorofluoromethane, ug/kg dw		<6.6	---	---
Trichloropropane, ug/kg dw		<6.6	---	---
Vinyl Chloride, ug/kg dw		<6.6	---	---
Xylenes, ug/kg dw		<6.6	---	---

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LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY		
PARAMETER		11612-2	11612-3	11612-4
11612-2	Lab Blank			Client
11612-3	Accuracy (% Recovery)			
11612-4	Precision (% RPD)			
Organophosphorus Pesticides				
Azinphos methyl, ug/kg dw	<200	---	---	---
Bolstar (Sulprofos), ug/kg dw	<10	---	---	---
Chlorpyrifos, ug/kg dw	<2.0	108 %	3.7 %	
Coumaphos, ug/kg dw	<100	---	---	---
Demeton-O, ug/kg dw	<20	---	---	---
Demeton-S, ug/kg dw	<20	---	---	---
Diazinon, ug/kg dw	<10	96 %	9.4 %	
Dichlorvos, ug/kg dw	<20	---	---	---
Disulfoton, ug/kg dw	<10	116 %	3.4 %	
Ethoprop, ug/kg dw	<2.0	---	---	---
Fensulfothion, ug/kg dw	<100	---	---	---
Fenthion, ug/kg dw	<2.0	---	---	---
Merphos, ug/kg dw	<10	---	---	---
Mevinphos, ug/kg dw	<2.0	---	---	---
Naled, ug/kg dw	<20	---	---	---
Methyl Parathion, ug/kg dw	<10	---	---	---
Phorate, ug/kg dw	<2.0	---	---	---
Ronnel, ug/kg dw	<2.0	---	---	---
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	---	---	---
Tokuthion (Prothifos), ug/kg dw	<10	---	---	---
Trichloronate, ug/kg dw	<100	---	---	---

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Project: Chevron Orlando/#5456

## REPORT OF RESULTS

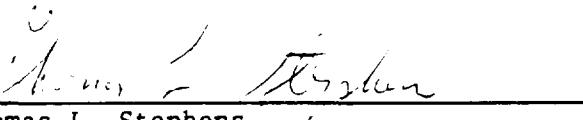
Page 8

LOG NO	SAMPLE DESCRIPTION , QC REPORT FOR SOLID/SEMISOLID	SAMPLED BY		
PARAMETER		11612-2	11612-3	11612-4
11612-2	Lab Blank			Client
11612-3	Accuracy (% Recovery)			
11612-4	Precision (% RPD)			
Chlorinated Herbicides (8150)				
2,4-D, ug/kg dw		<100	102 %	17 %
2,4-DB, ug/kg dw		<100	---	---
2,4,5-T, ug/kg dw		<60	---	---
2,4,5-TP Silvex, ug/kg dw		<20	109 %	17 %
Dalapon, ug/kg dw		<2000	---	---
Dicamba, ug/kg dw		<1000	122 %	36 %
Dichlorprop, ug/kg dw		<100	126 %	0.79 %
Dinoseb, ug/kg dw		<100	---	---
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw		<2000	---	---
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw		<2000	---	---
Arsenic, mg/kg dw		<1.0	114 %	
Chromium, mg/kg dw		<1.0	95 %	0 %
Zinc, mg/kg dw		2.0	91 %	1.1 %

Method: EPA 40 CFR Part 136

Method: EPA SW-846

HRS Certification #'s:81291,87279,E81005,E87052

  
Thomas L. Stephens

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY		
PARAMETER		11097-11	11097-12	11097-13
11097-11	CO-SB-23-02			Client
11097-12	CO-SB-32-01			
11097-13	CO-SB-33-01			
11097-14	CO-SB-29-02			
		11097-11	11097-12	11097-13
4-Chlorophenyl-phenyl ether, ug/kg dw	<33000*	<340	<340	<310
2,4-Dinitrotoluene, ug/kg dw	<33000*	<340	<340	<310
Diethyl Phthalate, ug/kg dw	<33000*	<340	<340	<310
N-Nitrosodiphenylamine, ug/kg dw	<33000*	<340	<340	<310
Hexachlorobenzene, ug/kg dw	<33000*	<340	<340	<310
gamma-BHC, ug/kg dw	<33000*	<340	<340	<310
4-Bromophenyl-phenyl-ether, ug/kg dw	<33000*	<340	<340	<310
delta-BHC, ug/kg dw	<33000*	<340	<340	<310
Phenanthrrene, ug/kg dw	<33000*	<340	<340	<310
Anthracene, ug/kg dw	<33000*	<340	<340	<310
beta-BHC, ug/kg dw	<33000*	<340	<340	<310
Heptachlor, ug/kg dw	<33000*	<340	<340	<310
alpha-BHC, ug/kg dw	<33000*	<340	<340	<310
Aldrin, ug/kg dw	<33000*	<340	<340	<310
Dibutyl phthalate, ug/kg dw	<33000*	<340	460	<310
Heptachlor epoxide, ug/kg dw	<33000*	<340	<340	<310
Endosulfan I, ug/kg dw	<33000*	<340	<340	<310
Fluoranthene, ug/kg dw	<33000*	<340	<340	<310
Dieldrin, ug/kg dw	<33000*	<340	<340	<310
4,4'-DDE, ug/kg dw	<33000*	<340	<340	<310
Pyrene, ug/kg dw	<33000*	<340	570	<310

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY		
11097-11	CO-SB-23-02			Client
11097-12	CO-SB-32-01			
11097-13	CO-SB-33-01			
11097-14	CO-SB-29-02			
PARAMETER		11097-11	11097-12	11097-13
Endrin, ug/kg dw		<33000*	<340	<340
Endosulfan II, ug/kg dw		<33000*	<340	<340
4,4'-DDD, ug/kg dw		92000	<340	<340
Benzidine, ug/kg dw		<270000*	<2700	<2700
4,4'-DDT, ug/kg dw		<33000*	<340	<340
Endosulfan sulfate, ug/kg dw		<33000*	<340	<340
Endrin Aldehyde, ug/kg dw		<33000*	<340	<340
Butylbenzylphthalate, ug/kg dw		<33000*	<340	<340
bis(2-Ethylhexyl) phthalate, ug/kg dw		<33000*	<340	290000
Chrysene, ug/kg dw		<33000*	<340	<340
Benzo(a)Anthracene, ug/kg dw		<33000*	<340	<340
3,3'-Dichlorobenzidine, ug/kg dw		<67000*	<680	<680
Di-n-octylphthalate, ug/kg dw		<33000*	<340	<340
Benzo(b)fluoranthene, ug/kg dw		<33000*	<340	<340
Benzo (k) Fluoranthene, ug/kg dw		<33000*	<340	<340
Benzo(a)pyrene, ug/kg dw		<33000*	<340	<340
Indeno (1,2,3-cd)pyrene, ug/kg dw		<33000*	<340	<340
Dibenz (a,h)anthracene, ug/kg dw		<33000*	<340	<340
Benzo(g,h,i)perylene, ug/kg dw		<33000*	<340	<340
N-Nitrosodimethylamine, ug/kg dw		<33000*	<340	<340
Chlordane, ug/kg dw		470000	<680	<680

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER		11097-11	11097-12	11097-13	11097-14
Toxaphene, ug/kg dw		<670000*	<6800	<6800	<6200
Aroclor-1016, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1221, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1232, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1242, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1248, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1254, ug/kg dw		<330000*	<3400	<3400	<3100
Aroclor-1260, ug/kg dw		<330000*	<3400	<3400	<3100
2-Chlorophenol, ug/kg dw		<33000*	<340	<340	<310
2-Nitrophenol, ug/kg dw		<33000*	<340	1200	<310
Phenol, ug/kg dw		<33000*	<340	1400	<310
2,4-Dimethylphenol, ug/kg dw		<33000*	<340	900	<310
2,4-Dichlorophenol, ug/kg dw		<33000*	<340	<340	<310
2,4,6-Trichlorophenol, ug/kg dw		<33000*	<340	<340	<310
4-Chloro-3-methylphenol, ug/kg dw		<33000*	<340	350	<310
2,4-Dinitrophenol, ug/kg dw		<170000*	<1700	<1700	<1600
2-Methyl-4,6-dinitrophenol, ug/kg dw		<170000*	<1700	<1700	<1600
Pentachlorophenol, ug/kg dw		<170000*	<1700	<1700	<1600
4-Nitrophenol, ug/kg dw		<170000*	<1700	<1700	<1600
Benzyl alcohol, ug/kg dw		<33000*	<340	<340	<310
2-Methylphenol (o-cresol), ug/kg dw		<33000*	<340	<340	<310

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER		11097-11	11097-12	11097-13	11097-14
11097-11	CO-SB-23-02				Client
11097-12	CO-SB-32-01				
11097-13	CO-SB-33-01				
11097-14	CO-SB-29-02				
4-Methylphenol (p-cresol), ug/kg dw		<33000*	<340	<340	<310
Benzoic acid, ug/kg dw		<170000*	<1700	<1700	<1600
4-Chloroaniline, ug/kg dw		<33000*	<340	<340	<310
2-Methylnaphthalene, ug/kg dw		<33000*	<340	<340	<310
2,4,5-Trichlorophenol, ug/kg dw		<33000*	<340	<340	<310
2-Nitroaniline, ug/kg dw		<170000*	<1700	<1700	<1600
3-Nitroaniline, ug/kg dw		<170000*	<1700	<1700	<1600
Dibenzofuran, ug/kg dw		<33000*	<340	<340	<310
4-Nitroaniline, ug/kg dw		<170000*	<1700	<1700	<1600

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER		11097-11	11097-12	11097-13	11097-14
Organophosphorus Pesticides					
Azinphos methyl, ug/kg dw	<200	<200	<190	<180	
Bolstar (Sulprofos), ug/kg dw	<10	<10	<10	<9.2	
Chlorpyrifos, ug/kg dw	1300	<2.0	<2.0	<1.8	
Coumaphos, ug/kg dw	<50000*	<100	<100	<92	
Demeton-O, ug/kg dw	1500	<20	<20	<18	
Demeton-S, ug/kg dw	210	<20	<20	<18	
Diazinon, ug/kg dw	<5000*	<10	<10	<9.2	
Dichlorvos, ug/kg dw	<10000*	<20	<20	<18	
Disulfoton, ug/kg dw	<5000*	<10	<10	<9.2	
Ethoprop, ug/kg dw	23	<2.0	<2.0	<1.8	
Fensulfothion, ug/kg dw	<50000*	<100	<100	<92	
Fenthion, ug/kg dw	<1000*	<2.0	<2.0	<1.8	
Merphos, ug/kg dw	<5000*	<10	<10	<9.2	
Mevinphos, ug/kg dw	<1000*	<2.0	<2.0	<1.8	
Naled, ug/kg dw	680	<20	<20	<18	
Methyl Parathion, ug/kg dw	<5000*	<10	<10	<9.2	
Phorate, ug/kg dw	58	<2.0	<2.0	<1.8	
Ronnel, ug/kg dw	<1000*	<2.0	<2.0	<1.8	
Stirophos (Tetrachlorvinphos), ug/kg dw	<5000*	<10	<10	<18	
Tokuthion (Prothiofos), ug/kg dw	<5000*	<10	<10	<18	
Trichloronate, ug/kg dw	<50000*	<100	<100	<180	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER		11097-11	11097-12	11097-13	11097-14
Chlorinated Herbicides (8150)					
2,4-D, ug/kg dw	<60000*	<100	<100	<500*	
2,4-DB, ug/kg dw	<60000*	<100	<100	<500*	
2,4,5-T, ug/kg dw	<36000*	<60	<60	<300*	
2,4,5-TP Silvex, ug/kg dw	<12000*	<20	<20	<100*	
Dalapon, ug/kg dw	<1200000*	<2000	<2000	<10000*	
Dicamba, ug/kg dw	<600000*	<1000	<1000	<5000*	
Dichlorprop, ug/kg dw	<60000*	<100	<100	<500*	
Dinoseb, ug/kg dw	<60000*	<100	<100	<500*	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<1200000*	<2000	<2000	<10000*	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<1200000*	<2000	<2000	<10000*	
Arsenic, mg/kg dw	<0.93	<0.75	<0.76	1.1	
Chromium, mg/kg dw	13	1.2	0.87	5.0	
Zinc, mg/kg dw	7.4	<1.5	<1.5	2.6	

\* = Increased detection limit is due to matrix interference.

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11097-15	11097-16
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
Volatile Organics			
Benzyl chloride, ug/kg dw		<5.3	<6.2
bis(2-Chloroethoxy) methane, ug/kg dw		<5.3	<6.2
Bis(2-chloroisopropyl)ether, ug/kg dw		<5.3	<6.2
Bromobenzene, ug/kg dw		<5.3	<6.2
Bromodichloromethane, ug/kg dw		<5.3	<6.2
Benzene, ug/kg dw		<5.3	<6.2
Bromoform, ug/kg dw		<5.3	<6.2
Bromomethane, ug/kg dw		<5.3	<6.2
Carbon Tetrachloride, ug/kg dw		<5.3	<6.2
Chloroacetaldehyde, ug/kg dw		<5.3	<6.2
Chlorobenzene, ug/kg dw		<5.3	<6.2
Chloroethane, ug/kg dw		<5.3	<6.2
Chloroform, ug/kg dw		<5.3	<6.2
1-Chlorohexane, ug/kg dw		<5.3	<6.2
2-Chloroethylvinyl Ether, ug/kg dw		<5.3	<6.2
Chloromethane, ug/kg dw		<5.3	<6.2
Chloromethyl methyl ether, ug/kg dw		<5.3	<6.2
Chlorotoluene, ug/kg dw		<5.3	<6.2
Dibromochloromethane, ug/kg dw		<5.3	<6.2
Dibromomethane, ug/kg dw		<5.3	<6.2
1,2-Dichlorobenzene, ug/kg dw		<5.3	<6.2
1,3-Dichlorobenzene, ug/kg dw		<5.3	<6.2

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11097-15	11097-16
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
1,4-Dichlorobenzene, ug/kg dw		<5.3	<6.2
Dichlorodifluoromethane, ug/kg dw		<5.3	<6.2
1,1-Dichloroethane, ug/kg dw		<5.3	<6.2
1,2-Dichloroethane, ug/kg dw		<5.3	<6.2
1,1-Dichloroethene, ug/kg dw		<5.3	<6.2
1,2-Dichloropropane, ug/kg dw		<5.3	<6.2
1,3-Dichloropropylene, ug/kg dw		<5.3	<6.2
Ethylbenzene, ug/kg dw		<5.3	<6.2
Methylene Chloride, ug/kg dw		<5.3	<6.2
1,1,2,2-Tetrachloroethane, ug/kg dw		<5.3	<6.2
1,1,1,2-Tetrachloroethane, ug/kg dw		<5.3	<6.2
Tetrachloroethylene, ug/kg dw		<5.3	<6.2
Toluene, ug/kg dw		<5.3	<6.2
1,1,1-Trichloroethane, ug/kg dw		<5.3	<6.2
1,1,2-Trichloroethane, ug/kg dw		<5.3	<6.2
Trichloroethene, ug/kg dw		<5.3	<6.2
Trichlorofluoromethane, ug/kg dw		<5.3	<6.2
Trichloropropene, ug/kg dw		<5.3	<6.2
Vinyl Chloride, ug/kg dw		<5.3	<6.2
Xylenes, ug/kg dw		<5.3	56

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
PARAMETER		11097-15	11097-16
Semivolatile Organics (8270)			
1,3-Dichlorobenzene, ug/kg dw		<320	<290
1,4-Dichlorobenzene, ug/kg dw		<320	<290
Hexachloroethane, ug/kg dw		<320	<290
bis(2-Chloroethyl) ether, ug/kg dw		<320	<290
1,2-Dichlorobenzene, ug/kg dw		<320	<290
Bis(2-chloroisopropyl)ether, ug/kg dw		<320	<290
N-Nitrosodi-N-Propylamine, ug/kg dw		<320	<290
Nitrobenzene, ug/kg dw		<320	<290
Hexachlorobutadiene, ug/kg dw		<320	<290
1,2,4-Trichlorobenzene, ug/kg dw		<320	<290
Isophorone, ug/kg dw		<320	<290
Naphthalene, ug/kg dw		<320	<290
bis(2-Chloroethoxy) methane, ug/kg dw		<320	<290
Hexachlorocyclopentadiene, ug/kg dw		<320	<290
2-Chloronaphthalene, ug/kg dw		<320	<290
Acenaphthylene, ug/kg dw		<320	<290
Acenaphthene, ug/kg dw		<320	<290
Dimethylphthalate, ug/kg dw		<320	<290
2,6-Dinitrotoluene, ug/kg dw		<320	<290
Fluorene, ug/kg dw		<320	<290
4-Chlorophenyl-phenyl ether, ug/kg dw		<320	<290
2,4-Dinitrotoluene, ug/kg dw		<320	<290

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11097-15	11097-16
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
Diethyl Phthalate, ug/kg dw		<320	<290
N-Nitrosodiphenylamine, ug/kg dw		<320	<290
Hexachlorobenzene, ug/kg dw		<320	<290
gamma-BHC, ug/kg dw		<320	<290
4-Bromophenyl-phenyl-ether, ug/kg dw		<320	<290
delta-BHC, ug/kg dw		<320	<290
Phenanthrene, ug/kg dw		<320	<290
Anthracene, ug/kg dw		<320	<290
beta-BHC, ug/kg dw		<320	<290
Heptachlor, ug/kg dw		<320	<290
alpha-BHC, ug/kg dw		<320	<290
Aldrin, ug/kg dw		<320	<290
Dibutyl phthalate, ug/kg dw		<320	<290
Heptachlor epoxide, ug/kg dw		<320	<290
Endosulfan I, ug/kg dw		<320	<290
Fluoranthene, ug/kg dw		<320	<290
Dieldrin, ug/kg dw		<320	<290
4,4'-DDE, ug/kg dw		<320	<290
Pyrene, ug/kg dw		<320	<290
Endrin, ug/kg dw		<320	<290
Endosulfan II, ug/kg dw		<320	<290
4,4'-DDD, ug/kg dw		<320	<290
Benzidine, ug/kg dw		<2600	<2300

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11097-15	11097-16
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
4,4'-DDT, ug/kg dw		<320	<290
Endosulfan sulfate, ug/kg dw		<320	<290
Endrin Aldehyde, ug/kg dw		<320	<290
Butylbenzylphthalate, ug/kg dw		<320	<290
bis(2-Ethylhexyl) phthalate, ug/kg dw		<320	76000
Chrysene, ug/kg dw		<320	<290
Benzo(a)Anthracene, ug/kg dw		<320	<290
3,3'-Dichlorobenzidine, ug/kg dw		<640	<590
Di-n-octylphthalate, ug/kg dw		<320	<290
Benzo(b)fluoranthene, ug/kg dw		<320	<290
Benzo (k) Fluoranthene, ug/kg dw		<320	<290
Benzo(a)pyrene, ug/kg dw		<320	<290
Indeno (1,2,3-cd)pyrene, ug/kg dw		<320	<290
Dibenz (a,h)anthracene, ug/kg dw		<320	<290
Benzo(g,h,i)perylene, ug/kg dw		<320	<290
N-Nitrosodimethylamine, ug/kg dw		<320	<290
Chlordane, ug/kg dw		<640	<590
Toxaphene, ug/kg dw		<6400	<5900
Aroclor-1016, ug/kg dw		<3200	<2900
Aroclor-1221, ug/kg dw		<3200	<2900
Aroclor-1232, ug/kg dw		<3200	<2900
Aroclor-1242, ug/kg dw		<3200	<2900
Aroclor-1248, ug/kg dw		<3200	<2900

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11097-15	11097-16
11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
Aroclor-1254, ug/kg dw		<3200	<2900
Aroclor-1260, ug/kg dw		<3200	<2900
2-Chlorophenol, ug/kg dw		<320	<290
2-Nitrophenol, ug/kg dw		<320	<290
Phenol, ug/kg dw		<320	<290
2,4-Dimethylphenol, ug/kg dw		<320	<290
2,4-Dichlorophenol, ug/kg dw		<320	<290
2,4,6-Trichlorophenol, ug/kg dw		<320	<290
4-Chloro-3-methylphenol, ug/kg dw		<320	<290
2,4-Dinitrophenol, ug/kg dw		<1600	<1500
2-Methyl-4,6-dinitrophenol, ug/kg dw		<1600	<1500
Pentachlorophenol, ug/kg dw		<1600	<1500
4-Nitrophenol, ug/kg dw		<1600	<1500
Benzyl alcohol, ug/kg dw		<320	<290
2-Methylphenol (o-cresol), ug/kg dw		<320	<290
4-Methylphenol (p-cresol), ug/kg dw		<320	<290
Benzoic acid, ug/kg dw		<1600	<1500
4-Chloroaniline, ug/kg dw		<320	<290
2-Methylnaphthalene, ug/kg dw		<320	<290
2,4,5-Trichlorophenol, ug/kg dw		<320	<290
2-Nitroaniline, ug/kg dw		<1600	<1500
3-Nitroaniline, ug/kg dw		<1600	<1500
Dibenzofuran, ug/kg dw		<320	<290
4-Nitroaniline, ug/kg dw		<1600	<1500
Arsenic, mg/kg dw		1.3	<0.92

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11097-15	CO-SB-29-01		Client
11097-16	CO-SB-31-01		
<hr/>			
PARAMETER		11097-15	11097-16
Chromium, mg/kg dw		5.4	1.4
Zinc, mg/kg dw		2.8	<1.8
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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY
11097-17	CO-SB-27-01	Client
PARAMETER		11097-17
Arsenic, mg/kg dw		1.4

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
<hr/>			
Volatile Organics			
Benzyl chloride, ug/l		<1.0	<1.0
bis(2-Chloroethoxy) methane, ug/l		<1.0	<1.0
Bis(2-chloroisopropyl)ether, ug/l		<1.0	<1.0
Bromobenzene, ug/l		<1.0	<1.0
Bromodichloromethane, ug/l		<1.0	<1.0
Benzene, ug/l		<1.0	<1.0
Bromoform, ug/l		<1.0	<1.0
Bromomethane, ug/l		<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0
Chloroacetaldehyde, ug/l		<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<1.0
Chloroethane, ug/l		<1.0	<1.0
Chloroform, ug/l		<1.0	3.0
1-Chlorohexane, ug/l		<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0
Chloromethane, ug/l		<1.0	<1.0
Chloromethyl methyl ether, ug/l		<1.0	<1.0
Chlorotoluene, ug/l		<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0
Dibromomethane, ug/l		<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
1,4-Dichlorobenzene, ug/l		<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0
1,1-Dichloroethene, ug/l		<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0
1,3-Dichloropropylene, ug/l		<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<1.0
Methylene Chloride, ug/l		<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l		<1.0	<1.0
Tetrachloroethylene, ug/l		<1.0	<1.0
Toluene, ug/l		<1.0	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<1.0
Trichloroethene, ug/l		<1.0	<1.0
Trichlorofluoromethane, ug/l		<1.0	<1.0
Trichloropropane, ug/l		<1.0	<1.0
Vinyl Chloride, ug/l		<1.0	<1.0
Xylenes, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
<hr/>			
Semivolatile Organics (8270)			
	1,3-Dichlorobenzene, ug/l	<10	<10
	1,4-Dichlorobenzene, ug/l	<10	<10
	Hexachloroethane, ug/l	<10	<10
	bis(2-Chloroethyl) ether, ug/l	<10	<10
	1,2-Dichlorobenzene, ug/l	<10	<10
	Bis(2-chloroisopropyl)ether, ug/l	<10	<10
	N-Nitrosodi-N-Propylamine, ug/l	<10	<10
	Nitrobenzene, ug/l	<10	<10
	Hexachlorobutadiene, ug/l	<10	<10
	1,2,4-Trichlorobenzene, ug/l	<10	<10
	Isophorone, ug/l	<10	<10
	Naphthalene, ug/l	<10	<10
	bis(2-Chloroethoxy) methane, ug/l	<10	<10
	Hexachlorocyclopentadiene, ug/l	<10	<10
	2-Chloronaphthalene, ug/l	<10	<10
	Acenaphthylene, ug/l	<10	<10
	Acenaphthene, ug/l	<10	<10
	Dimethylphthalate, ug/l	<10	<10
	2,6-Dinitrotoluene, ug/l	<10	<10
	Fluorene, ug/l	<10	<10
	4-Chlorophenyl-phenyl ether, ug/l	<10	<10
	2,4-Dinitrotoluene, ug/l	<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
Diethyl Phthalate, ug/l		<10	<10
N-Nitrosodiphenylamine, ug/l		<10	<10
Hexachlorobenzene, ug/l		<10	<10
gamma-BHC, ug/l		<10	<10
4-Bromophenyl-phenyl-ether, ug/l		<10	<10
delta-BHC, ug/l		<10	<10
Phenanthrene, ug/l		<10	<10
Anthracene, ug/l		<10	<10
beta-BHC, ug/l		<10	<10
Heptachlor, ug/l		<10	<10
alpha-BHC, ug/l		<10	<10
Aldrin, ug/l		<10	<10
Dibutyl phthalate, ug/l		<10	<10
Heptachlor epoxide, ug/l		<10	<10
Endosulfan I, ug/l		<10	<10
Fluoranthene, ug/l		<10	<10
Dieldrin, ug/l		<10	<10
4,4'-DDE, ug/l		<10	<10
Pyrene, ug/l		<10	<10
Endrin, ug/l		<10	<10
Endosulfan II, ug/l		<10	<10
4,4'-DDD, ug/l		<10	<10
Benzidine, ug/l		<80	<80

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11097-18	Equipment Blank		Client
11097-19	Field Blank		
PARAMETER		11097-18	11097-19
4,4'-DDT, ug/l		<10	<10
Endosulfan sulfate, ug/l		<10	<10
Endrin Aldehyde, ug/l		<10	<10
Butylbenzylphthalate, ug/l		<10	<10
bis(2-Ethylhexyl) phthalate, ug/l		<10	<10
Chrysene, ug/l		<10	<10
Benzo(a)Anthracene, ug/l		<10	<10
3,3'-Dichlorobenzidine, ug/l		<20	<20
Di-n-octylphthalate, ug/l		<10	<10
Benzo(b)fluoranthene, ug/l		<10	<10
Benzo (k) Fluoranthene, ug/l		<10	<10
Benzo(a)pyrene, ug/l		<10	<10
Indeno (1,2,3-cd)pyrene, ug/l		<10	<10
Dibenz (a,h)anthracene, ug/l		<10	<10
Benzo(g,h,i)perylene, ug/l		<10	<10
N-Nitrosodimethylamine, ug/l		<10	<10
Chlordane, ug/l		<20	<20
Toxaphene, ug/l		<200	<200
Aroclor-1016, ug/l		<100	<100
Aroclor-1221, ug/l		<100	<100
Aroclor-1232, ug/l		<100	<100
Aroclor-1242, ug/l		<100	<100
Aroclor-1248, ug/l		<100	<100

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
Aroclor-1254, ug/l		<100	<100
Aroclor-1260, ug/l		<100	<100
2-Chlorophenol, ug/l		<10	<10
2-Nitrophenol, ug/l		<10	<10
Phenol, ug/l		<10	<10
2,4-Dimethylphenol, ug/l		<10	<10
2,4-Dichlorophenol, ug/l		<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10
2,4-Dinitrophenol, ug/l		<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50
Pentachlorophenol, ug/l		<50	<50
4-Nitrophenol, ug/l		<50	<50
Benzyl alcohol, ug/l		<10	<10
2-Methylphenol (o-cresol), ug/l		<10	<10
4-Methylphenol (p-cresol), ug/l		<10	<10
Benzoic acid, ug/l		<50	<50
4-Chloroaniline, ug/l		<10	<10
2-Methylnaphthalene, ug/l		<10	<10
2,4,5-Trichlorophenol, ug/l		<10	<10
2-Nitroaniline, ug/l		<50	<50
3-Nitroaniline, ug/l		<50	<50
Dibenzofuran, ug/l		<10	<10
4-Nitroaniline, ug/l		<50	<50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
<b>Organophosphorus Pesticides</b>			
Azinphos methyl, ug/l		<1.0	<1.0
Bolstar (Sulprofos), ug/l		<0.050	<0.050
Chlorpyrifos, ug/l		<0.010	<0.010
Coumaphos, ug/l		<0.50	<0.50
Demeton-O, ug/l		<0.10	<0.10
Demeton-S, ug/l		<0.10	<0.10
Diazinon, ug/l		<0.050	<0.050
Dichlorvos, ug/l		<0.10	<0.10
Disulfoton, ug/l		<0.050	<0.050
Ethoprop, ug/l		<0.010	<0.010
Fensulfothion, ug/l		<0.50	<0.50
Fenthion, ug/l		<0.010	<0.010
Merphos, ug/l		<0.050	<0.050
Mevinphos, ug/l		<0.010	<0.010
Naled, ug/l		<0.10	<0.10
Methyl Parathion, ug/l		<0.050	<0.050
Phorate, ug/l		<0.010	<0.010
Ronnel, ug/l		<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l		<0.050	<0.050
Tokuthion (Prothifofos), ug/l		<0.050	<0.050
Trichloronate, ug/l		<0.50	<0.50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11097-18	11097-19
11097-18	Equipment Blank		Client
11097-19	Field Blank		
Chlorinated Herbicides (8150)			
2,4-D, ug/l		<0.50	<0.50
2,4-DB, ug/l		<0.50	<0.50
2,4,5-T, ug/l		<0.30	<0.30
2,4,5-TP Silvex, ug/l		<0.10	<0.10
Dalapon, ug/l		<10	<10
Dicamba, ug/l		<5.0	<5.0
Dichlorprop, ug/l		<0.50	<0.50
Dinoseb, ug/l		<0.50	<0.50
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l		<10	<10
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l		<10	<10
Arsenic, mg/l		<0.010	<0.010
Chromium, mg/l		<0.010	<0.010
Zinc, mg/l		<0.020	<0.020

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-20	Trip Blank	Client
PARAMETER		11097-20
<b>Volatile Organics</b>		
Benzyl chloride, ug/l		<1.0
bis(2-Chloroethoxy) methane, ug/l		<1.0
Bis(2-chloroisopropyl)ether, ug/l		<1.0
Bromobenzene, ug/l		<1.0
Bromodichloromethane, ug/l		<1.0
Benzene, ug/l		<1.0
Bromoform, ug/l		<1.0
Bromomethane, ug/l		<1.0
Carbon Tetrachloride, ug/l		<1.0
Chloroacetaldehyde, ug/l		<1.0
Chlorobenzene, ug/l		<1.0
Chloroethane, ug/l		<1.0
Chloroform, ug/l		<1.0
1-Chlorohexane, ug/l		<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0
Chloromethane, ug/l		<1.0
Chloromethyl methyl ether, ug/l		<1.0
Chlorotoluene, ug/l		<1.0
Dibromochloromethane, ug/l		<1.0
Dibromomethane, ug/l		<1.0
1,2-Dichlorobenzene, ug/l		<1.0
1,3-Dichlorobenzene, ug/l		<1.0
1,4-Dichlorobenzene, ug/l		<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY
11097-20	Trip Blank	Client
PARAMETER	11097-20	
Dichlorodifluoromethane, ug/l	<1.0	
1,1-Dichloroethane, ug/l	<1.0	
1,2-Dichloroethane, ug/l	<1.0	
1,1-Dichloroethene, ug/l	<1.0	
1,2-Dichloropropane, ug/l	<1.0	
1,3-Dichloropropylene, ug/l	<1.0	
Ethylbenzene, ug/l	<1.0	
Methylene Chloride, ug/l	<1.0	
1,1,2,2-Tetrachloroethane, ug/l	<1.0	
1,1,1,2-Tetrachloroethane, ug/l	<1.0	
Tetrachloroethylene, ug/l	<1.0	
Toluene, ug/l	<1.0	
1,1,1-Trichloroethane, ug/l	<1.0	
1,1,2-Trichloroethane, ug/l	<1.0	
Trichloroethene, ug/l	<1.0	
Trichlorodifluoromethane, ug/l	<1.0	
Trichloropropene, ug/l	<1.0	
Vinyl Chloride, ug/l	<1.0	
Xylenes, ug/l	<1.0	

Method: EPA 40 CFR Part 136

Method: EPA SW-846

HRS Certification #'s:81291,87279,E81005,E87052

  
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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY	
PARAMETER		11143-1	11143-2
11143-1	T-01		Client
11143-2	T-04		
Aromatic Volatiles (8020)			
Benzene, ug/kg dw		<5.0	<5.0
Chlorobenzene, ug/kg dw		<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw		<5.0	<5.0
1,3-Dichlorobenzene, ug/kg dw		<5.0	<5.0
1,4-Dichlorobenzene, ug/kg dw		<5.0	<5.0
Ethylbenzene, ug/kg dw		<5.0	<5.0
Toluene, ug/kg dw		<5.0	<5.0
Xylenes, ug/kg dw		<5.0	<5.0
Petroleum Hydrocarbons (418.1), mg/kg dw		<10	<10

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
Volatile Organics						
Benzyl chloride, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Bromobenzene, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Bromodichloromethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Benzene, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Bromoform, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Bromomethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Carbon Tetrachloride, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Chlorobenzene, ug/kg dw		<5.0	1400	<5.0	<5.0	580
Chloroethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Chloroform, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
1-Chlorohexane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
2-Chloroethylvinyl Ether, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Chloromethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Chlorotoluene, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Dibromochloromethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
Dibromomethane, ug/kg dw		<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw		<5.0	12000	<5.0	570	970
1,3-Dichlorobenzene, ug/kg dw		<5.0	840	<5.0	120	140
1,4-Dichlorobenzene, ug/kg dw		<5.0	28000	<5.0	1500	2800

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11143-3	CO-SB-01-01				Client
11143-4	CO-SB-02-01				
11143-5	CO-SB-3S-01				
11143-6	CO-SB-04-01				
11143-7	CO-SB-04-02				
PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Dichlorodifluoromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1-Dichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,2-Dichloropropane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,3-Dichloropropylene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Ethylbenzene, ug/kg dw	<5.0	3000	<5.0	7.7	1500
Methylene Chloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Tetrachloroethylene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Toluene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,1-Trichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichloroethene, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichlorofluoromethane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Trichloropropane, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Vinyl Chloride, ug/kg dw	<5.0	<500	<5.0	<5.0	<5.0
Xylenes, ug/kg dw	<5.0	57000	<5.0	7.7	1100

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
Semivolatile Organics (8270)						
1,3-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000	
1,4-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000	
Hexachloroethane, ug/kg dw	<340	<310	<330	<35000	<17000	
bis(2-Chloroethyl) ether, ug/kg dw	<340	<310	<330	<35000	<17000	
1,2-Dichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000	
Bis(2-chloroisopropyl)ether , ug/kg dw	<340	<310	<330	<35000	<17000	
N-Nitrosodi-N-Propylamine, ug/kg dw	<340	<310	<330	<35000	<17000	
Nitrobenzene, ug/kg dw	<340	<310	<330	<35000	<17000	
Hexachlorobutadiene, ug/kg dw	<340	<310	<330	<35000	<17000	
1,2,4-Trichlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000	
Isophorone, ug/kg dw	<340	<310	<330	<35000	<17000	
Naphthalene, ug/kg dw	<340	<310	<330	<35000	<17000	
bis(2-Chloroethoxy) methane, ug/kg dw	<340	<310	<330	<35000	<17000	
Hexachlorocyclopentadiene, ug/kg dw	<340	<310	<330	<35000	<17000	
2-Chloronaphthalene, ug/kg dw	<340	<310	<330	<35000	<17000	

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY			
PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Acenaphthylene, ug/kg dw	<340	<310	<330	<35000	<17000
Acenaphthene, ug/kg dw	<340	<310	<330	<35000	<17000
Dimethylphthalate, ug/kg dw	<340	<310	<330	<35000	<17000
2,6-Dinitrotoluene, ug/kg dw	<340	<310	<330	<35000	<17000
Fluorene, ug/kg dw	<340	<310	<330	<35000	<17000
4-Chlorophenyl-phenyl ether, ug/kg dw	<340	<310	<330	<35000	<17000
2,4-Dinitrotoluene, ug/kg dw	<340	<310	<330	<35000	<17000
Diethyl Phthalate, ug/kg dw	<340	<310	<330	<35000	<17000
N-Nitrosodiphenylamine, ug/kg dw	<340	<310	<330	<35000	<17000
Hexachlorobenzene, ug/kg dw	<340	<310	<330	<35000	<17000
gamma-BHC, ug/kg dw	550	<310	<330	76000	<17000
4-Bromophenyl-phenyl-ether, ug/kg dw	<340	<310	<330	<35000	<17000
delta-BHC, ug/kg dw	10000	2500	<330	130000	<17000
Phenanthrene, ug/kg dw	<340	<310	<330	<35000	<17000
Anthracene, ug/kg dw	<340	<310	<330	<35000	<17000
beta-BHC, ug/kg dw	11000	1700	<330	48000	<17000
Heptachlor, ug/kg dw	<340	580	<330	<35000	<17000
alpha-BHC, ug/kg dw	420	<310	<330	2100000	<17000

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11143-4	CO-SB-02-01					
11143-5	CO-SB-3S-01					
11143-6	CO-SB-04-01					
11143-7	CO-SB-04-02					
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
Aldrin, ug/kg dw		<340	<310	<330	<35000	<17000
Dibutyl phthalate, ug/kg dw		<340	<310	<330	<35000	<17000
Heptachlor epoxide, ug/kg dw		<340	<310	<330	<35000	<17000
Endosulfan I, ug/kg dw		<340	<310	<330	<35000	<17000
Fluoranthene, ug/kg dw		<340	<310	<330	<35000	<17000
Dieldrin, ug/kg dw		<340	1400	380	<35000	<17000
4,4'-DDE, ug/kg dw		1400	2300	<330	40000	<17000
Pyrene, ug/kg dw		<340	<310	<330	<35000	<17000
Endrin, ug/kg dw		<340	<310	<330	<35000	<17000
Endosulfan II, ug/kg dw		<340	<310	<330	<35000	<17000
4,4'-DDD, ug/kg dw		2200	1400	<330	490000	56000
Benzidine, ug/kg dw		<2700	<2500	<2600	<280000	<140000
4,4'-DDT, ug/kg dw		4800	10000	<330	<35000	<17000
Endosulfan sulfate, ug/kg dw		<340	<310	<330	<35000	<17000
Endrin Aldehyde, ug/kg dw		<340	<310	<330	<35000	<17000
Butylbenzylphthalate, ug/kg dw		<340	<310	<330	<35000	<17000
bis(2-Ethylhexyl) phthalate, ug/kg dw		<340	610	<330	<35000	<17000
Chrysene, ug/kg dw		<340	<310	<330	<35000	<17000
Benzo(a)Anthracene, ug/kg dw		<340	<310	<330	<35000	<17000

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11143-3	CO-SB-01-01					Client
11143-4	CO-SB-02-01					
11143-5	CO-SB-3S-01					
11143-6	CO-SB-04-01					
11143-7	CO-SB-04-02					
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
3,3'-Dichlorobenzidine, ug/kg dw	<680	<630	<660	<69000	<34000	
Di-n-octylphthalate, ug/kg dw	<340	<310	<330	<35000	<17000	
Benzo(b)fluoranthene, ug/kg dw	<340	<310	<330	<35000	<17000	
Benzo (k) Fluoranthene, ug/kg dw	<340	<310	<330	<35000	<17000	
Benzo(a)pyrene, ug/kg dw	<340	<310	<330	<35000	<17000	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<340	<310	<330	<35000	<17000	
Dibenz (a,h)anthracene, ug/kg dw	<340	<310	<330	<35000	<17000	
Benzo(g,h,i)perylene, ug/kg dw	<340	<310	<330	<35000	<17000	
N-Nitrosodimethylamine, ug/kg dw	<340	<310	<330	<35000	<17000	
Chlordane, ug/kg dw	8200	13000	43000	1400000	<34000	
Toxaphene, ug/kg dw	<6800	<6300	<6600	<690000	<340000	
Aroclor-1016, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1221, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1232, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1242, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1248, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1254, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
Aroclor-1260, ug/kg dw	<3400	<3100	<3300	<350000	<170000	
2-Chlorophenol, ug/kg dw	<340	<3100	<330	<350000	<170000	
2-Nitrophenol, ug/kg dw	<340	<3100	<330	<350000	<170000	

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11143-4	CO-SB-02-01					
11143-5	CO-SB-3S-01					
11143-6	CO-SB-04-01					
11143-7	CO-SB-04-02					
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
Phenol, ug/kg dw		<340	<3100	<330	<350000	<170000
2,4-Dimethylphenol, ug/kg dw		<340	<3100	<330	<350000	<170000
2,4-Dichlorophenol, ug/kg dw		<340	<3100	<330	<350000	<170000
2,4,6-Trichlorophenol, ug/kg dw		<340	<3100	<330	<350000	<170000
4-Chloro-3-methylphenol, ug/kg dw		<340	<3100	<330	<350000	<170000
2,4-Dinitrophenol, ug/kg dw		<1700	<1600	<1600	<170000	<85000
2-Methyl-4,6-dinitrophenol, ug/kg dw		<1700	<1600	<1600	<170000	<85000
Pentachlorophenol, ug/kg dw		<1700	<1600	<1600	<170000	<85000
4-Nitrophenol, ug/kg dw		<1700	<1600	<1600	<170000	<85000
Benzyl alcohol, ug/kg dw		<340	<310	<330	<35000	<17000
2-Methylphenol (o-cresol), ug/kg dw		<340	<310	<330	<35000	<17000
4-Methylphenol (p-cresol), ug/kg dw		<340	<310	<330	<35000	<17000
Benzoic acid, ug/kg dw		<1700	<1600	<1600	<170000	<85000
4-Chloroaniline, ug/kg dw		<340	<310	<330	<35000	<17000
2-Methylnaphthalene, ug/kg dw		<340	<310	<330	<35000	<17000
2,4,5-Trichlorophenol, ug/kg dw		<340	<310	<330	<35000	<17000
2-Nitroaniline, ug/kg dw		<1700	<1600	<1600	<170000	<85000
3-Nitroaniline, ug/kg dw		<1700	<1600	<1600	<170000	<85000
Dibenzofuran, ug/kg dw		<340	<310	<330	<35000	<17000
4-Nitroaniline, ug/kg dw		<1700	<1600	<1600	<170000	<85000

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LOG NO	SAMPLE DESCRIPTION , SOLID OR SEMISOLID SAMPLES	SAMPLED BY				
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
<b>Organophosphorus Pesticides</b>						
Azinphos methyl, ug/kg dw		<200	<180	<190	<210	<200
Bolstar (Sulprofos), ug/kg dw		<10	<8.8	<9.6	<10	<10
Chlorpyrifos, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Coumaphos, ug/kg dw		<100	<88	<96	<100	<100
Demeton-0, ug/kg dw		<20	<18	<19	<21	<20
Demeton-S, ug/kg dw		<20	<18	<19	<21	<20
Diazinon, ug/kg dw		<10	<8.8	<9.6	<10	<10
Dichlorvos, ug/kg dw		<20	<18	<19	<21	<20
Disulfoton, ug/kg dw		<10	<8.8	<9.6	<10	<10
Ethoprop, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Fensulfothion, ug/kg dw		<100	<88	<96	<100	<100
Fenthion, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Merphos, ug/kg dw		<10	<8.8	<9.6	<10	<10
Mevinphos, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Naled, ug/kg dw		<20	<18	<19	<21	<20
Methyl Parathion, ug/kg dw		<10	<8.8	<9.6	<10	<10
Phorate, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Ronnel, ug/kg dw		<2.0	<1.8	<1.9	<2.1	<2.0
Stirophos (Tetrachlorvinphos), ug/kg dw		<10	<8.8	<9.6	<10	<10

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11143-4	CO-SB-02-01					
11143-5	CO-SB-3S-01					
11143-6	CO-SB-04-01					
11143-7	CO-SB-04-02					
PARAMETER		11143-3	11143-4	11143-5	11143-6	11143-7
Tokuthion (Prothiofos), ug/kg dw	<10	<8.8	<9.6	<10	<10	<10
Trichloronate, ug/kg dw	<100	<88	<96	<100	<100	<100
Additional Compounds:						
Ethion, ug/kg dw	<10	<8.8	<9.6	140	650	
<b>Chlorinated Herbicides (8150)</b>						
2,4-D, ug/kg dw	<600*	<550*	<550*	<3000*	<290*	
2,4-DB, ug/kg dw	<600*	<550*	<550*	<3000*	<290*	
2,4,5-T, ug/kg dw	<360*	<330*	<330*	<18000*	<170*	
2,4,5-TP Silvex, ug/kg dw	<120*	<110*	<110*	<590*	<57*	
Dalapon, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*	
Dicamba, ug/kg dw	<6000*	<5500*	<5500*	<30000*	<2900*	
Dichlorprop, ug/kg dw	<600*	<550*	<550*	<3000*	<290*	
Dinoseb, ug/kg dw	<600*	<550*	<550*	<3000*	<290*	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<12000*	<11000*	<11000*	<300000*	<5800*	
Arsenic, mg/kg dw	13	6.3	<0.87	11	27	

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11143-4	CO-SB-02-01	
11143-5	CO-SB-3S-01	
11143-6	CO-SB-04-01	
11143-7	CO-SB-04-02	

PARAMETER	11143-3	11143-4	11143-5	11143-6	11143-7
Chromium, mg/kg dw	2.3	2.0	1.5	16	2.4
Zinc, mg/kg dw	15	<1.7	8.1	410	3.7

\* = Increased detection limit due to matrix interference.

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
<b>Volatile Organics</b>					
Benzyl chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromodichloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Benzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromoform, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Bromomethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Carbon Tetrachloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloroform, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1-Chlorohexane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
2-Chloroethylvinyl Ether, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Chlorotoluene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromochloromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Dibromomethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichlorobenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,4-Dichlorobenzene, ug/kg dw	<5.0	380	<5.0	<5.0	<5.0

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Dichlorodifluoromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1-Dichloroethene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,2-Dichloropropane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,3-Dichloropropylene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Ethylbenzene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Methylene Chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2,2-Tetrachloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1,2-Tetrachloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Tetrachloroethylene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Toluene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,1-Trichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
1,1,2-Trichloroethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloroethene, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichlorofluoromethane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Trichloropropane, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Vinyl Chloride, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0
Xylenes, ug/kg dw	<5.0	<5.0	<5.0	<5.0	<5.0

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11143-9	CO-SB-05-02					
11143-10	CO-SB-06-01					
11143-11	CO-SB-07-01					
11143-12	CO-SB-08-01					
PARAMETER		11143-8	11143-9	11143-10	11143-11	11143-12
Semivolatile Organics (8270)						
1,3-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
1,4-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Hexachloroethane, ug/kg dw	<1700	<340	<3200	<59000	<1700	
bis(2-Chloroethyl) ether, ug/kg dw	<1700	<340	<3200	<59000	<1700	
1,2-Dichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Bis(2-chloroisopropyl)ether , ug/kg dw	<1700	<340	<3200	<59000	<1700	
N-Nitrosodi-N-Propylamine, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Nitrobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Hexachlorobutadiene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
1,2,4-Trichlorobenzene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Isophorone, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Naphthalene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
bis(2-Chloroethoxy) methane, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Hexachlorocyclopentadiene, ug/kg dw	<1700	<340	<3200	<59000	<1700	

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11143-9	CO-SB-05-02					
11143-10	CO-SB-06-01					
11143-11	CO-SB-07-01					
11143-12	CO-SB-08-01					
PARAMETER		11143-8	11143-9	11143-10	11143-11	11143-12
2-Chloronaphthalene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Acenaphthylene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Acenaphthene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Dimethylphthalate, ug/kg dw		<1700	<340	<3200	<59000	<1700
2,6-Dinitrotoluene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Fluorene, ug/kg dw		<1700	<340	<3200	<59000	<1700
4-Chlorophenyl-phenyl ether, ug/kg dw		<1700	<340	<3200	<59000	<1700
2,4-Dinitrotoluene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Diethyl Phthalate, ug/kg dw		<1700	<340	<3200	<59000	<1700
N-Nitrosodiphenylamine, ug/kg dw		<1700	<340	<3200	<59000	<1700
Hexachlorobenzene, ug/kg dw		<1700	<340	<3200	<59000	<1700
gamma-BHC, ug/kg dw		<1700	<340	<3200	<59000	<1700
4-Bromophenyl-phenyl-ether, ug/kg dw		<1700	<340	<3200	<59000	<1700
delta-BHC, ug/kg dw		<1700	<340	<3200	320000	<1700
Phenanthrene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Anthracene, ug/kg dw		<1700	<340	<3200	<59000	<1700
beta-BHC, ug/kg dw		<1700	<340	<3200	81000	<1700
Heptachlor, ug/kg dw		<1700	<340	<3200	<59000	<1700

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11143-9	CO-SB-05-02					
11143-10	CO-SB-06-01					
11143-11	CO-SB-07-01					
11143-12	CO-SB-08-01					
PARAMETER		11143-8	11143-9	11143-10	11143-11	11143-12
alpha-BHC, ug/kg dw		<1700	<340	<3200	72000	<1700
Aldrin, ug/kg dw		5100	<340	<3200	<59000	<1700
Dibutyl phthalate, ug/kg dw		<1700	<340	<3200	<59000	<1700
Heptachlor epoxide, ug/kg dw		<1700	<340	<3200	<59000	<1700
Endosulfan I, ug/kg dw		<1700	<340	<3200	<59000	<1700
Fluoranthene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Dieldrin, ug/kg dw		3500	<340	<3200	<59000	<1700
4,4'-DDE, ug/kg dw		7700	<340	14000	160000	<1700
Pyrene, ug/kg dw		<1700	<340	<3200	<59000	<1700
Endrin, ug/kg dw		<1700	<340	<3200	<59000	<1700
Endosulfan II, ug/kg dw		<1700	<340	<3200	<59000	<1700
4,4'-DDD, ug/kg dw		15000	<340	18000	1600000	<1700
Benzidine, ug/kg dw		<14000	<2700	<26000	<470000	<13000
4,4'-DDT, ug/kg dw		<1700	<340	13000	1800000	<1700
Endosulfan sulfate, ug/kg dw		<1700	<340	<3200	<59000	<1700
Endrin Aldehyde, ug/kg dw		<1700	<340	<3200	<59000	<1700
Butylbenzylphthalate, ug/kg dw		<1700	<340	<3200	<59000	<1700
bis(2-Ethylhexyl) phthalate, ug/kg dw		<1700	350	<3200	<59000	<1700
Chrysene, ug/kg dw		<1700	<340	<3200	<59000	<1700

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11143-9	CO-SB-05-02					
11143-10	CO-SB-06-01					
11143-11	CO-SB-07-01					
11143-12	CO-SB-08-01					
PARAMETER		11143-8	11143-9	11143-10	11143-11	11143-12
Benzo(a)Anthracene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
3,3'-Dichlorobenzidine, ug/kg dw	<3400	<680	<6400	<120000	<3300	
Di-n-octylphthalate, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Benzo(b)fluoranthene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Benzo (k) Fluoranthene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Benzo(a)pyrene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Indeno (1,2,3-cd)pyrene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Dibenz (a,h)anthracene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Benzo(g,h,i)perylene, ug/kg dw	<1700	<340	<3200	<59000	<1700	
N-Nitrosodimethylamine, ug/kg dw	<1700	<340	<3200	<59000	<1700	
Chlordane, ug/kg dw	18000	<680	<6400	160000	5100	
Toxaphene, ug/kg dw	<34000	<6800	<64000	<1200000	<33000	
Aroclor-1016, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1221, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1232, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1242, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1248, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1254, ug/kg dw	<17000	<3400	<32000	<590000	<17000	
Aroclor-1260, ug/kg dw	<17000	<340	<3200	<590000	<17000	
2-Chlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700	

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11143-9	CO-SB-05-02				
11143-10	CO-SB-06-01				
11143-11	CO-SB-07-01				
11143-12	CO-SB-08-01				
PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
2-Nitrophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
Phenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dimethylphenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4,6-Trichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Chloro-3-methylphenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4-Dinitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
2-Methyl-4,6-dinitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Pentachlorophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
4-Nitrophenol, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Benzyl alcohol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Methylphenol (o-cresol), ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Methylphenol (p-cresol), ug/kg dw	<1700	<340	<3200	<59000	<1700
Benzoic acid, ug/kg dw	<8500	<1700	<16000	<300000	<8300
4-Chloroaniline, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Methylnaphthalene, ug/kg dw	<1700	<340	<3200	<59000	<1700
2,4,5-Trichlorophenol, ug/kg dw	<1700	<340	<3200	<59000	<1700
2-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300
3-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300
Dibenzofuran, ug/kg dw	<1700	<340	<3200	<59000	<1700
4-Nitroaniline, ug/kg dw	<8500	<1700	<16000	<300000	<8300

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
<b>Organophosphorus Pesticides</b>					
Azinphos methyl, ug/kg dw	<200	<200	<170	<210	<210
Bolstar (Sulprofos), ug/kg dw	<10	<9.8	<8.6	<10	<10
Chlorpyrifos, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Coumaphos, ug/kg dw	<100	<98	<86	<100	<100
Demeton-O, ug/kg dw	<20	<20	<17	<21	<21
Demeton-S, ug/kg dw	<20	<20	<17	<21	<21
Diazinon, ug/kg dw	<10	<9.8	<8.6	<10	<10
Dichlorvos, ug/kg dw	<20	<20	<17	<21	<21
Disulfoton, ug/kg dw	<10	<9.8	<8.6	<10	<10
Ethoprop, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Fensulfothion, ug/kg dw	<100	<98	<86	<100	<100
Fenthion, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Merphos, ug/kg dw	<10	<9.8	<8.6	<10	<10
Mevinphos, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Naled, ug/kg dw	<20	<20	<17	<21	<21
Methyl Parathion, ug/kg dw	<10	<9.8	<8.6	<10	<10
Phorate, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Ronnel, ug/kg dw	<2.0	<2.0	<1.7	<2.1	<2.1
Stirophos (Tetrachlorvinphos), ug/kg dw	<10	<9.8	<8.6	<10	<10

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Tokuthion (Prothiofos), ug/kg dw	<10	<9.8	<8.6	<10	<10
Trichloronate, ug/kg dw	<100	<98	<86	<100	<100
Ethion, ug/kg dw	<10	<9.8	<8.6	<10	<10

Chlorinated Herbicides (8150)	11143-8	11143-9	11143-10	11143-11	11143-12
2,4-D, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
2,4-DB, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
2,4,5-T, ug/kg dw	<360*	<330*	<170*	<1900*	<3600*
2,4,5-TP Silvex, ug/kg dw	<120*	<110*	<55*	<630*	<1200*
Dalapon, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
Dicamba, ug/kg dw	<6000*	<5500*	<2800*	<33000*	<60000*
Dichlorprop, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
Dinoseb, ug/kg dw	<600*	<550*	<280*	<3300*	<6000*
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/kg dw	<12000*	<11000*	<5600*	<66000*	<120000*
Arsenic, mg/kg dw	38	31	22	86	<0.94



2 2 0231

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11143-9	CO-SB-05-02	
11143-10	CO-SB-06-01	
11143-11	CO-SB-07-01	
11143-12	CO-SB-08-01	

PARAMETER	11143-8	11143-9	11143-10	11143-11	11143-12
Chromium, mg/kg dw	14	2.6	18	26	6.4
Zinc, mg/kg dw	38	3.1	9.7	200	58

\* = Increased detection limit due to matrix interference.

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PARAMETER		11143-13	11143-14
11143-13	Field Blank		Client
11143-14	Equipment Blank		
Volatile Organics			
Benzyl chloride, ug/l		<1.0	<1.0
Bromobenzene, ug/l		<1.0	<1.0
Bromodichloromethane, ug/l		<1.0	<1.0
Benzene, ug/l		<1.0	<1.0
Bromoform, ug/l		<1.0	<1.0
Bromomethane, ug/l		<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<1.0
Chloroethane, ug/l		<1.0	<1.0
Chloroform, ug/l		<1.0	<1.0
1-Chlorohexane, ug/l		<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<1.0
Chloromethane, ug/l		<1.0	<1.0
Chlorotoluene, ug/l		<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<1.0
Dibromomethane, ug/l		<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<1.0
1,4-Dichlorobenzene, ug/l		<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11143-13	11143-14
1,1-Dichloroethene, ug/l		<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<1.0
1,3-Dichloropropylene, ug/l		<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<1.0
Methylene Chloride, ug/l		<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<1.0
1,1,1,2-Tetrachloroethane, ug/l		<1.0	<1.0
Tetrachloroethylene, ug/l		<1.0	<1.0
Toluene, ug/l		<1.0	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<1.0
Trichloroethene, ug/l		<1.0	<1.0
Trichlorofluoromethane, ug/l		<1.0	<1.0
Trichloropropane, ug/l		<1.0	<1.0
Vinyl Chloride, ug/l		<1.0	<1.0
Xylenes, ug/l		<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11143-13	11143-14
Semivolatile Organics (8270)			
1,3-Dichlorobenzene, ug/l		<10	<10
1,4-Dichlorobenzene, ug/l		<10	<10
Hexachloroethane, ug/l		<10	<10
bis(2-Chloroethyl) ether, ug/l		<10	<10
1,2-Dichlorobenzene, ug/l		<10	<10
Bis(2-chloroisopropyl)ether, ug/l		<10	<10
N-Nitrosodi-N-Propylamine, ug/l		<10	<10
Nitrobenzene, ug/l		<10	<10
Hexachlorobutadiene, ug/l		<10	<10
1,2,4-Trichlorobenzene, ug/l		<10	<10
Isophorone, ug/l		<10	<10
Naphthalene, ug/l		<10	<10
bis(2-Chloroethoxy) methane, ug/l		<10	<10
Hexachlorocyclopentadiene, ug/l		<10	<10
2-Chloronaphthalene, ug/l		<10	<10
Acenaphthylene, ug/l		<10	<10
Acenaphthene, ug/l		<10	<10
Dimethylphthalate, ug/l		<10	<10
2,6-Dinitrotoluene, ug/l		<10	<10
Fluorene, ug/l		<10	<10
4-Chlorophenyl-phenyl ether, ug/l		<10	<10
2,4-Dinitrotoluene, ug/l		<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11143-13	11143-14
Diethyl Phthalate, ug/l		<10	<10
N-Nitrosodiphenylamine, ug/l		<10	<10
Hexachlorobenzene, ug/l		<10	<10
gamma-BHC, ug/l		<10	<10
4-Bromophenyl-phenyl-ether, ug/l		<10	<10
delta-BHC, ug/l		<10	<10
Phenanthrene, ug/l		<10	<10
Anthracene, ug/l		<10	<10
beta-BHC, ug/l		<10	<10
Heptachlor, ug/l		<10	<10
alpha-BHC, ug/l		<10	<10
Aldrin, ug/l		<10	<10
Dibutyl phthalate, ug/l		<10	<10
Heptachlor epoxide, ug/l		<10	<10
Endosulfan I, ug/l		<10	<10
Fluoranthene, ug/l		<10	<10
Dieldrin, ug/l		<10	<10
4,4'-DDE, ug/l		<10	<10
Pyrene, ug/l		<10	<10
Endrin, ug/l		<10	<10
Endosulfan II, ug/l		<10	<10
4,4'-DDD, ug/l		<10	<10
Benzidine, ug/l		<80	<80

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11143-13	11143-14
4,4'-DDT, ug/l		<10	<10
Endosulfan sulfate, ug/l		<10	<10
Endrin Aldehyde, ug/l		<10	<10
Butylbenzylphthalate, ug/l		<10	<10
bis(2-Ethylhexyl) phthalate, ug/l		99	<10
Chrysene, ug/l		<10	<10
Benzo(a)Anthracene, ug/l		<10	<10
3,3'-Dichlorobenzidine, ug/l		<20	<20
Di-n-octylphthalate, ug/l		<10	<10
Benzo(b)fluoranthene, ug/l		<10	<10
Benzo (k) Fluoranthene, ug/l		<10	<10
Benzo(a)pyrene, ug/l		<10	<10
Indeno (1,2,3-cd)pyrene, ug/l		<10	<10
Dibenz (a,h)anthracene, ug/l		<10	<10
Benzo(g,h,i)perylene, ug/l		<10	<10
N-Nitrosodimethylamine, ug/l		<10	<10
Chlordane, ug/l		<20	<20
Toxaphene, ug/l		<200	<200
Aroclor-1016, ug/l		<100	<100
Aroclor-1221, ug/l		<100	<100
Aroclor-1232, ug/l		<100	<100
Aroclor-1242, ug/l		<100	<100
Aroclor-1248, ug/l		<100	<100

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
PARAMETER		11143-13	11143-14
Aroclor-1254, ug/l		<100	<100
Aroclor-1260, ug/l		<100	<100
2-Chlorophenol, ug/l		<10	<10
2-Nitrophenol, ug/l		<10	<10
Phenol, ug/l		<10	<10
2,4-Dimethylphenol, ug/l		<10	<10
2,4-Dichlorophenol, ug/l		<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10
2,4-Dinitrophenol, ug/l		<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50
Pentachlorophenol, ug/l		<50	<50
4-Nitrophenol, ug/l		<50	<50
Benzyl alcohol, ug/l		51	<10
2-Methylphenol (o-cresol), ug/l		<10	<10
4-Methylphenol (p-cresol), ug/l		<10	<10
Benzoic acid, ug/l		<50	<50
4-Chloroaniline, ug/l		<10	<10
2-Methylnaphthalene, ug/l		<10	<10
2,4,5-Trichlorophenol, ug/l		<10	<10
2-Nitroaniline, ug/l		<50	<50
3-Nitroaniline, ug/l		<50	<50
Dibenzofuran, ug/l		<10	<10
4-Nitroaniline, ug/l		<50	<50

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY	
11143-13	Field Blank		Client
11143-14	Equipment Blank		
PARAMETER		11143-13	11143-14
Organophosphorus Pesticides			
Azinphos methyl, ug/l		<1.0	<1.0
Bolstar (Sulprofos), ug/l		<0.050	<0.050
Chlorpyrifos, ug/l		<0.010	<0.010
Coumaphos, ug/l		<0.050	<0.50
Demeton-O, ug/l		<0.10	<0.10
Demeton-S, ug/l		<0.10	<0.10
Diazinon, ug/l		<0.050	<0.050
Dichlorvos, ug/l		<0.10	<0.10
Disulfoton, ug/l		<0.050	<0.050
Ethoprop, ug/l		<0.010	<0.010
Fensulfothion, ug/l		<0.50	<0.50
Fenthion, ug/l		<0.010	<0.010
Merphos, ug/l		<0.050	<0.050
Mevinphos, ug/l		<0.010	<0.010
Naled, ug/l		<0.10	<0.10
Methyl Parathion, ug/l		<0.050	<0.050
Phorate, ug/l		<0.010	<0.010
Ronnel, ug/l		<0.010	<0.010
Stirophos (Tetrachlorvinphos), ug/l		<0.050	<0.050
Tokuthion (Prothifofos), ug/l		<0.050	<0.050
Trichloronate, ug/l		<0.50	<0.50
Additional Compounds:			
Ethion, ug/l		<0.050	<0.050

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PARAMETER		11143-13	11143-14
Chlorinated Herbicides (8150)			
2,4-D, ug/l	<0.50	<0.50	
2,4-DB, ug/l	<0.50	<0.50	
2,4,5-T, ug/l	<0.30	<0.30	
2,4,5-TP Silvex, ug/l	<0.10	<0.10	
Dalapon, ug/l	<10	<10	
Dicamba, ug/l	<5.0	<5.0	
Dichlorprop, ug/l	<0.50	<0.50	
Dinoseb, ug/l	<0.50	<0.50	
(4-Chloro-2-Methylphenoxy)-Acetic Acid, ug/l	<10	<10	
2-(4-Chloro-2-Methylphenoxy)-Propanoic Acid, ug/l	<10	<10	
Arsenic, mg/l	<0.010	<0.010	
Chromium, mg/l	<0.010	<0.010	
Zinc, mg/l	<0.020	<0.020	

Method: EPA 40 CFR Part 136

Method: EPA SW-846

HRS Certification #'s:81291,87279,E81005,E87052

  
Thomas L. Stephens

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
601 and 602						
Bromodichloromethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Bromoform, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Bromomethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Benzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Carbon Tetrachloride, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Chlorobenzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Chloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
2-Chloroethylvinyl Ether, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Chloroform, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Ethylbenzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Chloromethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Dibromochloromethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichlorobenzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,3-Dichlorobenzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,4-Dichlorobenzene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Dichlorodifluoromethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,1-Dichloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,1-Dichloroethene, ug/l		<1.0	<25	<1.0	<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11187-1	CO-MW-M-01					Client
11187-2	CO-MW-O-01					
11187-3	CO-MW-P-01					
11187-4	CO-MW-A-01					
11187-5	CO-MW-A-02					
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
cis/trans-1,2-Dichloroethyl ene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,2-Dichloropropane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Cis-1,3-Dichloropropene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Trans-1,3-Dichloropropene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Methylene Chloride, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,1,2,2-Tetrachloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Tetrachloroethylene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Toluene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,1,1-Trichloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
1,1,2-Trichloroethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Trichloroethene, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Trichlorofluoromethane, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Vinyl Chloride, ug/l		<1.0	<25	<1.0	<1.0	<1.0
Xylenes, ug/l		<1.0	420	<1.0	<1.0	<1.0

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
<b>BN-A Extractables (625)</b>						
Acenaphthene, ug/l		<10	<10	<10	<10	<10
Acenaphthylene, ug/l		<10	<10	<10	<10	<10
Anthracene, ug/l		<10	<10	<10	<10	<10
Aldrin, ug/l		<10	<10	<10	<10	<10
Benzo(a)Anthracene, ug/l		<10	<10	<10	<10	<10
Benzo(b)fluoranthene, ug/l		<10	<10	<10	<10	<10
Benzo (k) Fluoranthene, ug/l		<10	<10	<10	<10	<10
Benzo(a)pyrene, ug/l		<10	<10	<10	<10	<10
Benzo(g,h,i)perylene, ug/l		<10	<10	<10	<10	<10
Benzyl butyl phthalate, ug/l		<10	<10	<10	<10	<10
beta-BHC, ug/l		<10	<10	<10	<10	<10
delta-BHC, ug/l		<10	<10	<10	<10	<10
bis(2-Chloroethyl) ether, ug/l		<10	<10	<10	<10	<10
bis(2-Chloroethoxy) methane, ug/l		<10	<10	<10	<10	<10
bis(2-Ethylhexyl) phthalate, ug/l		<10	<10	<10	<10	<10
Bis(2-chloroisopropyl)ether, ug/l		<10	<10	<10	<10	<10
4-Bromophenyl-phenyl-ether, ug/l		<10	<10	<10	<10	<10
Chlordane, ug/l		<20	<20	<20	<20	<20
2-Chloronaphthalene, ug/l		<10	<10	<10	<10	<10

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LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
4-Chlorophenyl-phenyl ether, ug/l	<10	<10	<10	<10	<10	<10
Chrysene, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDD, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDE, ug/l	<10	<10	<10	<10	<10	<10
4,4'-DDT, ug/l	<10	<10	<10	<10	<10	<10
Dibenz (a,h)anthracene, ug/l	<10	<10	<10	<10	<10	<10
Di-n-butylphthalate, ug/l	<10	<10	<10	<10	<10	<10
1,3-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
1,2-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
1,4-Dichlorobenzene, ug/l	<10	<10	<10	<10	<10	<10
3,3'-Dichlorobenzidine, ug/l	<20	<20	<20	<20	<20	<20
Dieldrin, ug/l	<10	<10	<10	<10	<10	<10
Diethyl Phthalate, ug/l	<10	<10	<10	<10	<10	<10
Dimethyl phthalate, ug/l	<10	<10	<10	<10	<10	<10
2,4-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10	<10
2,6-Dinitrotoluene, ug/l	<10	<10	<10	<10	<10	<10
Di-n-octylphthalate, ug/l	<10	<10	<10	<10	<10	<10
Endosulfan sulfate, ug/l	<10	<10	<10	<10	<10	<10
Endrin Aldehyde, ug/l	<10	<10	<10	<10	<10	<10
Fluoranthene, ug/l	<10	<10	<10	<10	<10	<10

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11187-1	CO-MW-M-01				Client	
11187-2	CO-MW-O-01					
11187-3	CO-MW-P-01					
11187-4	CO-MW-A-01					
11187-5	CO-MW-A-02					
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
Fluorene, ug/l		<10	<10	<10	<10	<10
Heptachlor, ug/l		<10	<10	<10	<10	<10
Heptachlor epoxide, ug/l		<10	<10	<10	<10	<10
Hexachlorobenzene, ug/l		<10	<10	<10	<10	<10
Hexachlorobutadiene, ug/l		<10	<10	<10	<10	<10
Hexachloroethane, ug/l		<10	<10	<10	<10	<10
Indeno (1,2,3-cd)pyrene, ug/l		<10	<10	<10	<10	<10
Isophorone, ug/l		<10	<10	<10	<10	<10
Naphthalene, ug/l		<10	<10	<10	<10	<10
Nitrobenzene, ug/l		<10	<10	<10	<10	<10
N-Nitrosodi-N-Propylamine, ug/l		<10	<10	<10	<10	<10
Aroclor-1016, ug/l		<100	<100	<100	<100	<100
Aroclor-1221, ug/l		<100	<100	<100	<100	<100
Aroclor-1232, ug/l		<100	<100	<100	<100	<100
Aroclor-1242, ug/l		<100	<100	<100	<100	<100
Aroclor-1248, ug/l		<100	<100	<100	<100	<100
Aroclor-1254, ug/l		<100	<100	<100	<100	<100
Aroclor-1260, ug/l		<100	<100	<100	<100	<100
Phenanthrene, ug/l		<10	<10	<10	<10	<10
Pyrene, ug/l		<10	<10	<10	<10	<10

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LOG NO: T0-11187

Received: 18 OCT 90

Mr. Russ Bowen  
 Brown & Caldwell  
 201 E. Pine Street, Suite 1416  
 Orlando, Florida 32801-2729

Project: Chevron Orlando/#5456

REPORT OF RESULTS

Page 6

LOG NO	SAMPLE DESCRIPTION , LIQUID SAMPLES	SAMPLED BY				
11187-1	CO-MW-M-01				Client	
11187-2	CO-MW-O-01					
11187-3	CO-MW-P-01					
11187-4	CO-MW-A-01					
11187-5	CO-MW-A-02					
PARAMETER		11187-1	11187-2	11187-3	11187-4	11187-5
Toxaphene, ug/l		<200	<200	<200	<200	<200
1,2,4-Trichlorobenzene, ug/l		<10	<10	<10	<10	<10
4-Chloro-3-methylphenol, ug/l		<10	<10	<10	<10	<10
2-Chlorophenol, ug/l		<10	<10	<10	<10	<10
2,4-Dichlorophenol, ug/l		<10	<10	<10	<10	<10
2,4-Dimethylphenol, ug/l		<10	<10	<10	<10	<10
2,4-Dinitrophenol, ug/l		<50	<50	<50	<50	<50
2-Methyl-4,6-dinitrophenol, ug/l		<50	<50	<50	<50	<50
2-Nitrophenol, ug/l		<10	<10	<10	<10	<10
4-Nitrophenol, ug/l		<50	<50	<50	<50	<50
Pentachlorophenol, ug/l		<50	<50	<50	<50	<50
Phenol, ug/l		<10	<10	<10	<10	<10
2,4,6-Trichlorophenol, ug/l		<10	<10	<10	<10	<10
Phosphorus Pesticides (614)						
Azinphos methyl, ug/l		<1.0	<1.0	<1.0	<1.0	<1.0
Demeton-O, ug/l		<0.50	1.1	<0.50	<0.50	<0.50
Demeton-S, ug/l		<0.50	<0.50	<0.50	<0.50	<0.50
Diazinon, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Disulfoton, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Malathion, ug/l		<0.10	<0.10	<0.10	<0.10	<0.10
Parathion Ethyl, ug/l		<0.050	<0.050	110	<0.050	<0.050
Parathion Methyl, ug/l		<0.050	<0.050	0.16	<0.050	<0.050

**Table 3-1. Soil Sampling Depths**

<b>Sampling Location</b>	<b>Sampling Depth, feet BLS</b>
1	0 - 0.5
2	0 - 0.5
4A	0 - 0.5
4B	1.5 - 2.0
5A	0 - 0.5
5B	1.5 - 2.0
6	0 - 0.5
7	0 - 0.5
8	0 - 0.5
9 <sup>a</sup>	0 - 0.5
10 <sup>a</sup>	1.5 - 2.0
11 <sup>a</sup>	1.5 - 2.0
12 <sup>a</sup>	1.5 - 2.0
13 <sup>a</sup>	1.5 - 2.0
14 <sup>a</sup>	1.5 - 2.0
15 <sup>a</sup>	1.5 - 2.0
16 <sup>a</sup>	1.5 - 2.0
17A	4.5 - 5
17B	7.5 - 8
18A	4.5 - 5

**Table 3-1. Soil Sampling Depths (Cont.)**

<b>Sampling Location</b>	<b>Sampling Depth, feet BLS</b>
18B	7.5 - 8
19	4.5 - 5
20	4.5 - 5
21	4.5 - 5
22A	4.5 - 5
22B	7.5 - 8
23A	4.5 - 5
23B	7.5 - 8
24 <sup>a</sup>	1.5 - 2.0
25 <sup>a</sup>	1.5 - 2.0
26 <sup>a</sup>	1.5 - 2.0
27	4.5 - 5
28 <sup>a</sup>	1.5 - 2.0
29 <sup>b</sup>	4.5 - 5
30	0 - 0.5
31 <sup>b</sup>	4.5 - 5
35	0 - 0.5

<sup>a</sup> Composite sample comprised of four subsamples as shown on Figures 3-4 and 3-5.

<sup>b</sup> Composite sample comprised of two subsamples as shown on Figure 3-5.

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**CHAPTER 3. FIELD INVESTIGATION METHODS**

Sample jars were tagged with Brown and Caldwell labels, taped if appropriate, sealed with a custody seal and finally taped inside plastic bags and logged on a chain-of-custody form. Samples were stored in coolers at 4 degrees Celsius (on ice) and shipped overnight via Federal Express to the laboratory.

Spikes and blanks provided by EPA's TAT representative were included for analysis.

### 3.5 AQUIFER TESTING

To develop estimates of aquifer characteristics, slug testing was performed on monitor wells O, K and L. The slug test is a method for determining the hydraulic conductivity of formation material near a test well.

The slug test was conducted by creating an instantaneous change in water level in the well and recording the rate of recovery to the initial level. The slug was made using hollow PVC pipe filled with 20/30 silica sand and capped on both ends. The PVC pipe was decontaminated and had all ink removed. The slug length was 10.05 feet and the diameter was 0.16 feet.

Water level and depth of well measurements were made before introducing the slug into the well. After putting the slug in the well, the water level was allowed to stabilize and the slug was then removed from the well. Water level measurements were made until the well had recovered 90 percent of its static water level. Water level measurements were made using a standard water level indicator tape and time for each measurement was recorded.

## CHAPTER 4.0

### ***DATA PRESENTATION***

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#### 4.1 SITE HYDROGEOLOGY

Information gathered during the September and October 1990 field investigations indicates that the site is underlain by fine to very fine quartz sands to a depth of approximately 33 feet. This sand horizon becomes saturated with water between 5 and 15 feet below land surface, forming an unconfined groundwater aquifer. Water table elevation contours suggest a northeasterly groundwater flow direction for the shallow portion of the aquifer beneath the site.

##### 4.1.1 Water Table Elevations

All monitor wells were surveyed following installation to provide vertical elevation data accurate to 0.01 feet above mean sea level (MSL). Water level data collected during the October 15, 1990 monitor well sampling were correlated to this survey data to evaluate groundwater gradient and potential direction of migration. Surveyed elevation and water levels are presented in Table 4-1.

See  
Table  
4-1

Water table elevation in the 7 to 17-foot screened zone appears to change by approximately 2 feet across the site in a predominantly north-eastern direction, with a high point of approximately 95 feet MSL in the vicinity of monitor well D (MW-D). Potentiometric surface elevations in the 23- to 33-foot screened zone change by approximately 3.5 feet in a predominantly northern direction with a high point of approximately 97 feet MSL in the vicinity of monitor well F (MW-F). Water table and potentiometric surface elevation contours are presented on Figures 4-1 and 4-2.

See  
Figures  
4-1 and  
4-2

##### 4.1.2 Aquifer Testing and Analysis

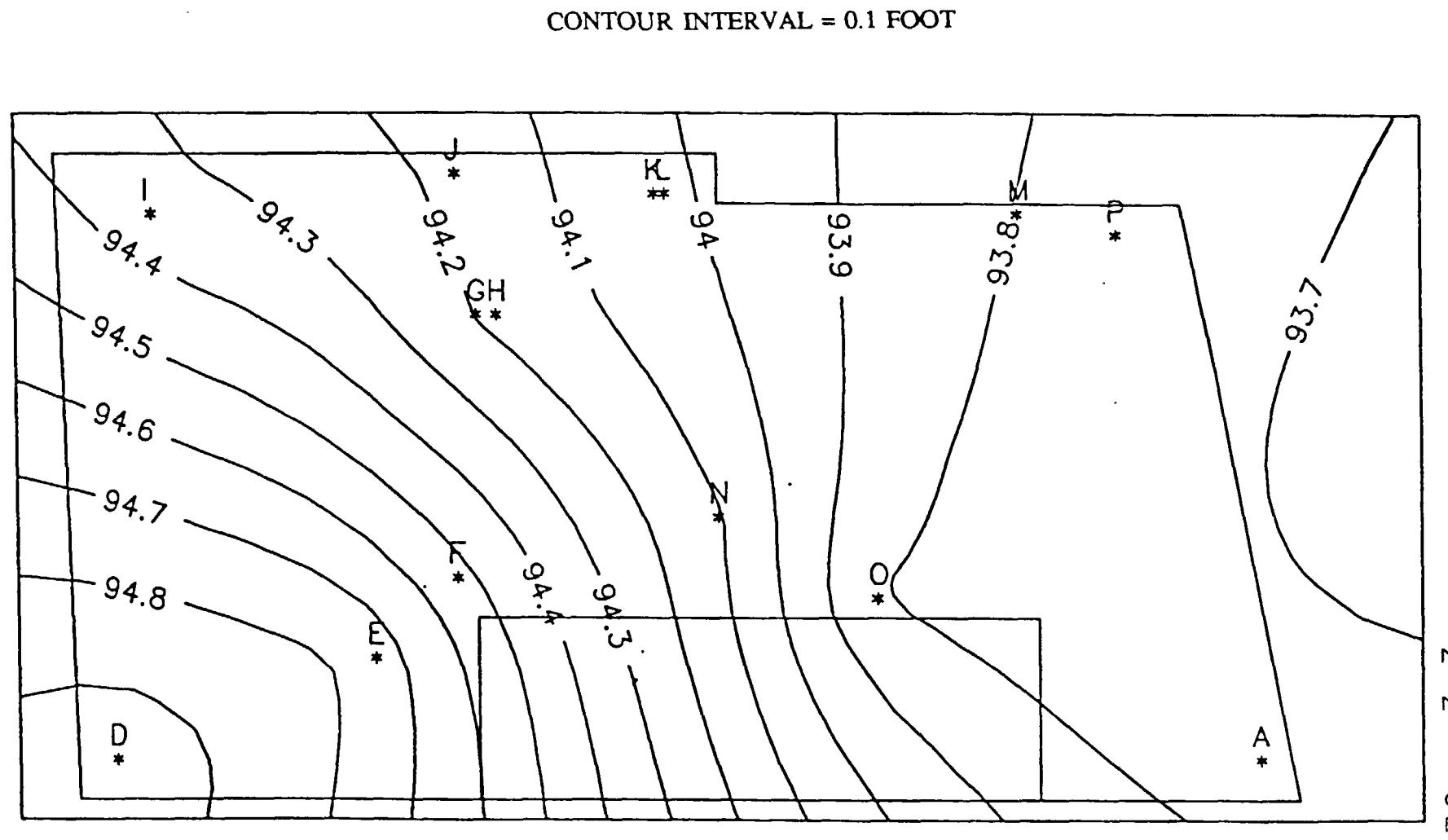
Permeability (slug) testing was performed on three monitor wells located on the site to determine the hydraulic conductivity of the saturated aquifer in the vicinity of each monitor well. The slug test is performed by quickly withdrawing a volume of water from each well and measuring the subsequent rate of rise of the water table elevation in each well.

Slug tests were performed on monitor wells O and L, which are 17 feet deep, and well K, which is 33 feet deep. The recovery (in feet) versus the time (in seconds) are plotted on semilogarithmic paper, and a straight line is drawn through the major portion of the plotted

2 2 0250

**TABLE 4-1. CHEVRON-ORLANDO WATER TABLE ELEVATIONS  
OCTOBER 15, 1990**

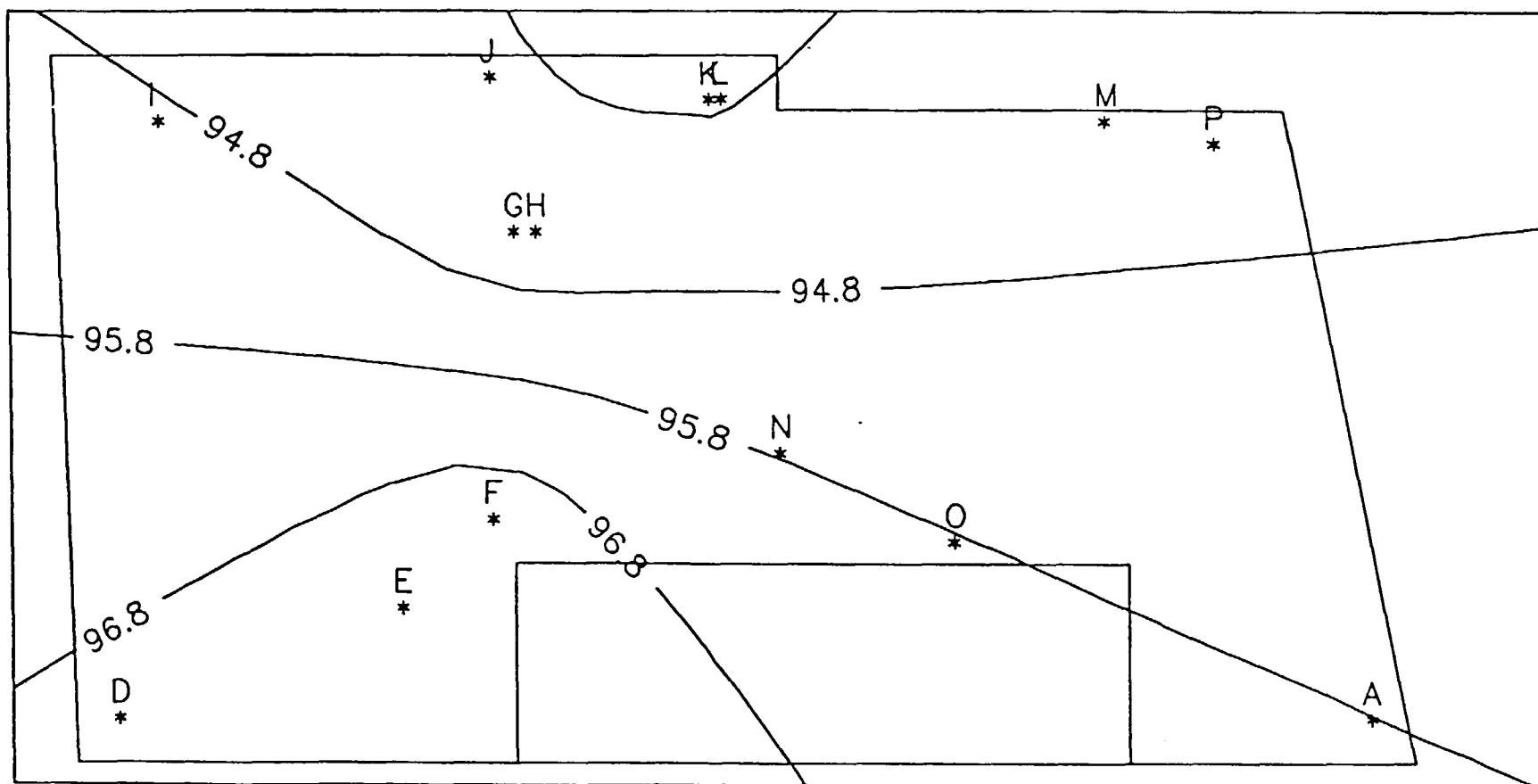
WELL ID	SURVEYED ELEVATION	MEASURED WATER LEVEL	WATER LEVEL (referenced to MSL)
A	104.92	11.18	93.74
D	102.46	7.50	94.96
E	103.26	8.47	94.79
F	103.41	6.00	97.41
G	102.66	9.18	93.48
H	102.54	8.37	94.17
I	102.06	7.72	94.34
J	102.28	8.10	94.18
K	102.32	8.60	93.72
L	102.36	8.66	93.70
M	103.58	11.16	92.42
N	102.72	8.61	94.11
O	103.92	10.12	93.80
P	103.86	12.41	91.45



**Brown and Caldwell**  
Consultants

Figure 4-1. Water Level Elevation, 7-17 Foot Screen Interval

CONTOUR INTERVAL = 1 FOOT



2 2 0252

**CHAPTER 4. DATA PRESENTATION**

curve. The Bower and Rice (1976) equation is then used to calculate hydraulic conductivity ( $k$ ), as follows:

$$k = \left( \frac{r_c^2 \ln (R_e/r_w)}{2L_e} \right) \left( \frac{1}{t} \right) \left( \ln \frac{Y_0}{Y_t} \right)$$

where  $R_e$  = effective radial distance over which the head difference  $Y$  is dissipated,  
 $r_w$  = radial distance between well center and undisturbed aquifer  
 $L_e$  = height of screened section of the well through which groundwater enters,  
 $Y_0$  = water level at time zero,  
 $Y_t$  = water level at time  $t$ , and  
 $t$  = time since  $Y_0$ .

The time versus recovery plots for wells O, L, and K, and shown on Figures 4-3, 4-4, and 4-5, respectively. The calculated values of hydraulic conductivity are summarized in Table 4-2. The average value of hydraulic conductivity for the site is 3 feet per day. This value is typical for fine to medium grained silty sand.

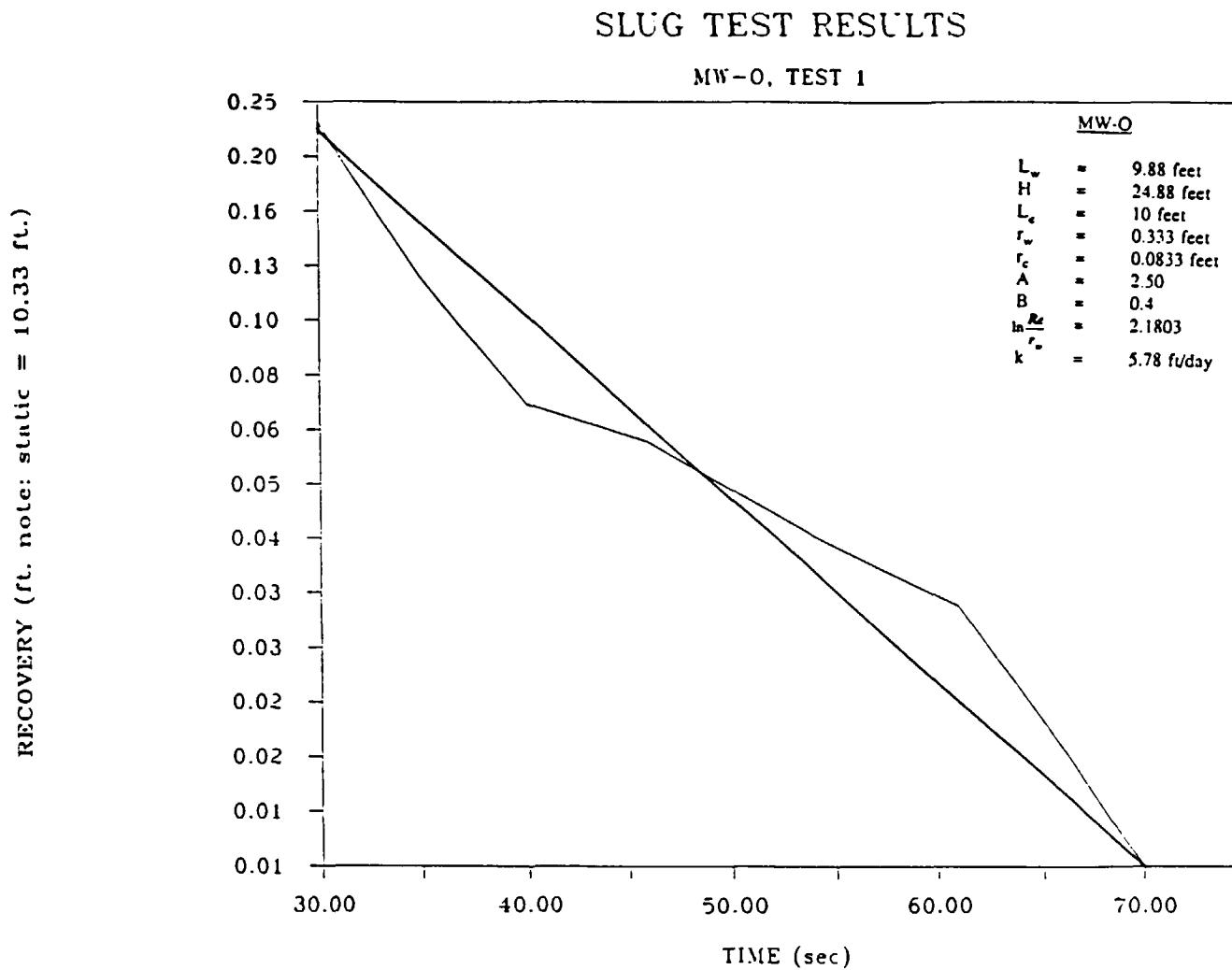
See  
Figures  
4-3, 4-4, &  
4-5 and  
Table  
4-2

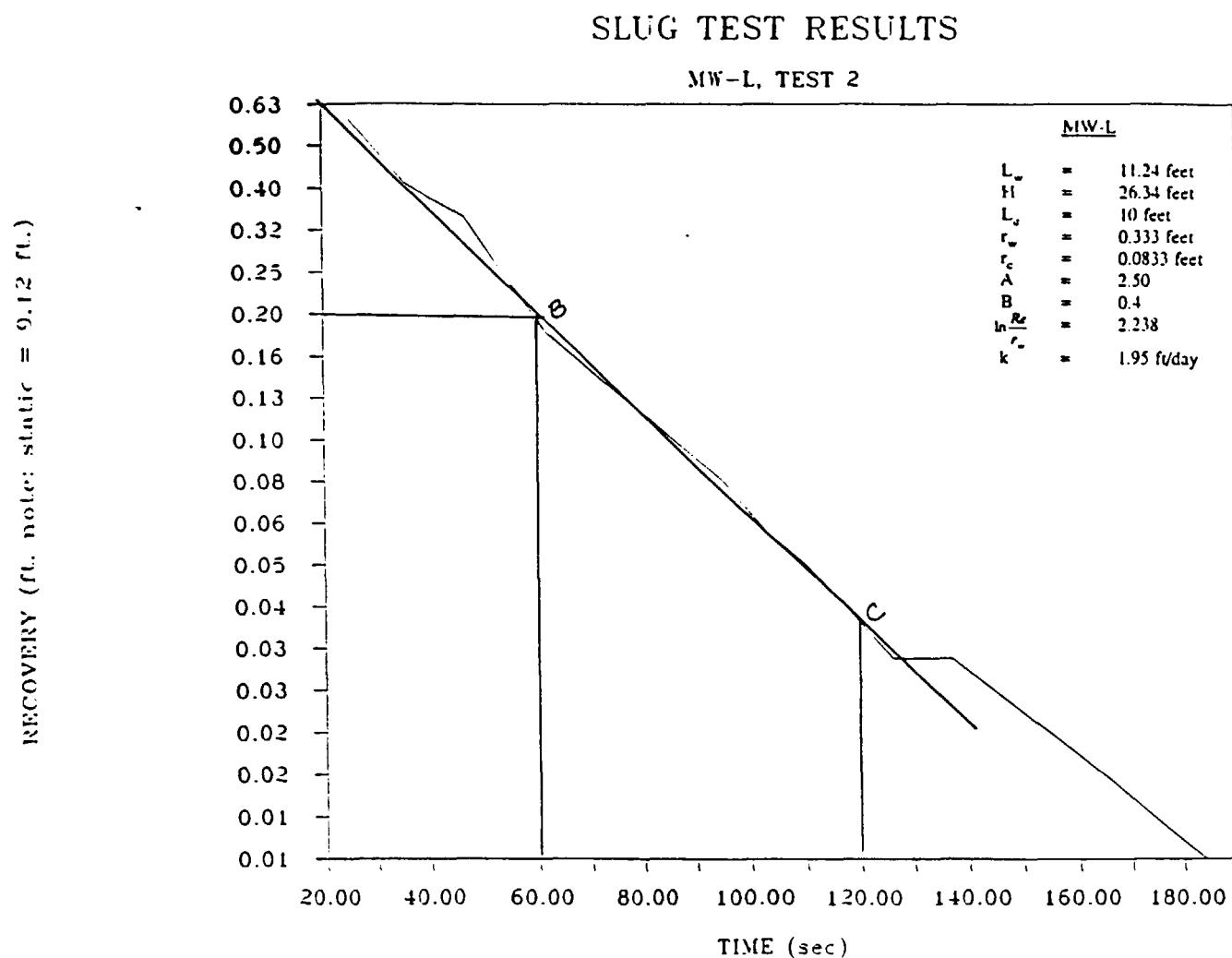
#### 4.2 SOIL SAMPLE ANALYTICAL RESULTS

Soil samples were collected to determine the degree and extent of soil contamination in potential contaminant source areas (e.g., rinsate pond area), and to screen the northern and western portions of the site for contamination. These samples were collected and analyzed for combinations of volatile and semivolatile organic compounds, organochlorine and organophosphate pesticides, polychlorinated biphenyls (PCBs), chlorinated herbicides, arsenic, chromium, and zinc, depending on location and suspected activity.

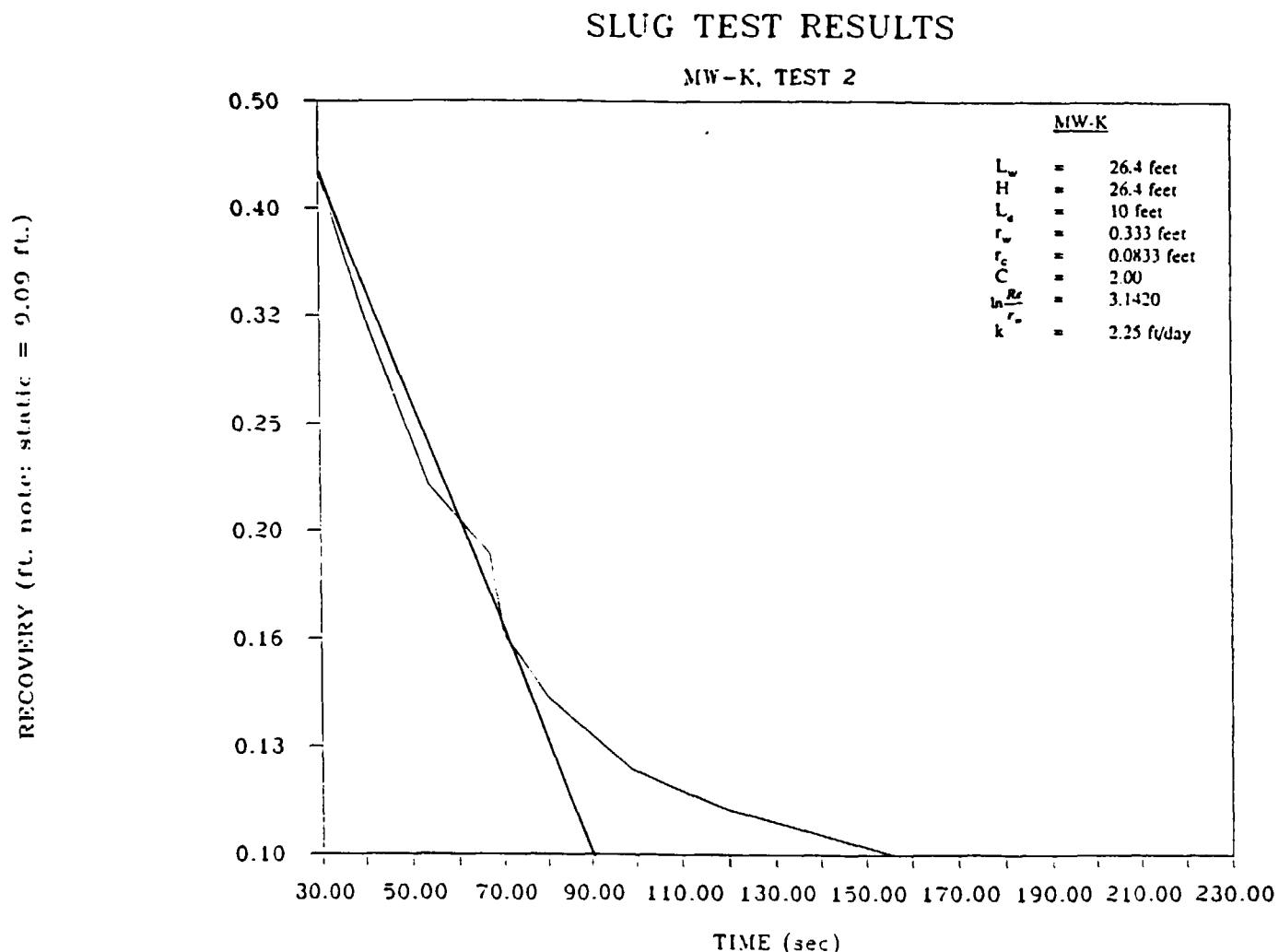
Soil samples can be generally categorized into four groups:

- shallow (1.5 - 2.0 ft. depth) composite samples collected by the hand-auger method to generally characterize the northern and western portions of the site, including the above ground storage tank area, outside operations area, and barrel storage area,





220256



**TABLE 4-2**

<b>WELL NUMBER</b>	<b>HYDRAULIC CONDUCTIVITY (feet/day)</b>
O	5.78
L	1.95
K	2.25

Arithmetic Mean            3.33

Geometric Mean            2.94

**CHAPTER 4. DATA PRESENTATION**

- deep (4.5 - 5.0 ft and 7.5 - 8.0 ft depth) samples collected with split-spoon samplers to generally characterize the area in and around the rinsate pond and septic tank drainfields.
- samples collected at various depths by the hand-auger method to characterize the rail spur area.
- samples collected around the underground storage tank to investigate possible petroleum contamination.

**4.2.1 Shallow Composite Samples**

Shallow composite sample SB-09 (above ground storage tank area) and an additional sample of sludge taken from the inside the sump around the storage tanks were analyzed for purgeable organics (Methods 8010 and 8020) and semivolatile organics, organochlorine pesticides, and PCB's (Method 8270). Samples SB-10 (outside operations area) and SB-11 (barrel storage area) were analyzed for purgeable organics, semivolatile organics, organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010).

Samples SB-12 through SB-16, -24, -25, -26, and -28 were analyzed for semivolatile organics, organophosphate pesticides, and chlorinated herbicides.

Although not a composite sample, SB-30, from a suspected parathion spill area is included with this sample grouping. SB-30 was analyzed for organophosphate pesticides only. The results of analysis for this group of samples are given in Table 4-3. All laboratory data are presented in Appendix C.

Volatile constituents ethylbenzene, toluene, xylene, and chlorinated benzenes were detected in SB-10, 11, and 26. The highest levels were detected in SB-26 at 19,700 micrograms per kilogram ( $\mu\text{g}/\text{kg}$ ) total volatiles, predominantly xylene at 14,000  $\mu\text{g}/\text{kg}$ , with chlorobenzene at 2400  $\mu\text{g}/\text{kg}$  and lesser concentration of ethylbenzene, 1,4-dichlorobenzene and toluene. Volatile constituents may also be present in the sludge sample collected from the sump around the storage tanks. The laboratory reported that this sample was grossly contaminated with a suite of organic components, but was unable to identify specific compounds due to the high concentrations.

Organochlorine pesticides, predominantly chlordane, were detected in SB-12, 13, 15, 16, and 24 through 28. The highest level of chlordane was detected in SB-16 at 1,100,000  $\mu\text{g}/\text{kg}$ . In addition to chlordane, SB-28 contained dieldrin (760  $\mu\text{g}/\text{kg}$ ), 4,4'-DDE (390  $\mu\text{g}/\text{kg}$ ), and 4,4'-DDT (980  $\mu\text{g}/\text{kg}$ ). SB-15 did not contain chlordane, but did contain heptachlor, dieldrin, 4,4'-DDE, 4,4'-DDT, and endrin for a total organochlorine pesticide content of 8,160  $\mu\text{g}/\text{kg}$ . 4,4'-DDT was also detected in SB-13 at 410  $\mu\text{g}/\text{kg}$ . 4,4'-DDD was detected at 51,000  $\mu\text{g}/\text{kg}$ .

See  
Table  
4-3

Table 4-3. Chevron Orlando Site Assessment  
Shallow Soil Sample Analytical Results  
September, 1990

Parameter	Units	Sludge	Sample Number														
			SB-09	SB-10	SB-11	SB-12	SB-13	SB-14	SB-15	SB-16	SB-24	SB-25	SB-26	DUP-26	SB-28	SB-30	
Depth	Ft.	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	1.5-2.0	
Type (Composite or Grab)	--	C	C	C	C	C	C	C	C	C	C	C	C	C	C	G	
Chlorobenzene	ug/kg	*	BDL	140	BDL	NA	2400	NA	NA	NA							
1,3-Dichlorobenzene	ug/kg	*	BDL	15	BDL												
1,4-Dichlorobenzene	ug/kg	*	BDL	200	BDL	970	BDL	BDL	BDL								
Ethylbenzene	ug/kg	*	BDL	51	390	NA	1400	NA	NA	NA							
Toluene	ug/kg	*	BDL	81	BDL	NA	930	NA	NA	NA							
Xylenes	ug/kg	*	BDL	130	3300	NA	14000	NA	NA	NA							
Heptachlor	ug/kg	*	*	BDL	*	BDL	BDL	BDL	460	*	*	*	*	*	BDL	BDL	
Endosulfan I	ug/kg	*	*	BDL	*	BDL	BDL	BDL	BDL	117000	*	*	*	*	BDL	BDL	
Dieldrin	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1200	*	*	*	*	*	760	BDL	
4,4'-DDE	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1100	*	*	*	*	*	390	BDL	
4,4'-DDD	ug/kg	*	*	BDL	*	BDL	BDL	BDL	BDL	*	*	*	*	51000	BDL	BDL	
4,4'-DDT	ug/kg	*	*	BDL	*	BDL	BDL	410	BDL	4200	*	*	*	*	980	BDL	
Endrin	ug/kg	*	*	BDL	*	BDL	BDL	BDL	1200	*	*	*	*	*	BDL	BDL	
Chlordane	ug/kg	NA	NA	1300	*	4600	73000	BDL	BDL	1100000	760000	100000	87000	*	13000	BDL	
Demeton-S	ug/kg	NA	NA	BDL	BDL	BDL	BDL	BDL	BDL	420	BDL	BDL	BDL	BDL	BDL	BDL	
Ethion	ug/kg	NA	NA	400	28	BDL	BDL	BDL	BDL	190000	54000	31	75	52	BDL	BDL	
Arsenic	mg/kg	NA	NA	2.8	BDL	NA											
Chromium	mg/kg	NA	NA	4.6	1.3	NA											
Zinc	mg/kg	NA	NA	6.9	3.9	NA											

BDL = below detectable limits

NA = not analyzed

\* = detection limit extremely elevated due to matrix interference

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**CHAPTER 4. DATA PRESENTATION**

in a duplicate sample of SB-26, but not in the original. Endosulfan I was found in SB-16 at 117,000 µg/kg.

No other compounds normally detected in Method 8270 were detected in this group of samples. In SB-09, 11, 16, and 24 through 26, detection limits were elevated by many orders of magnitude due to "matrix interference" that may mask the presence of other compounds.

Organophosphate pesticides were detected in SB-10, 11, 16, and 24 through 26, with the highest in SB-16 at 190,000 µg/kg. Ethion, not normally an analyte in Method 8140, accounted for all detected organophosphates with the exception of demeton-S detected in SB-24 at 420 µg/kg.

Detection limits for many of the organophosphates included in Method 8140 were elevated by several orders of magnitude. This, as indicated by the laboratory performing the analysis, may have been due to interference by the presence in the samples of high levels of other organophosphates (e.g. malathion, guthion, etc.) that are not included in Method 8140. Chlorinated herbicides were not detected.

Arsenic, chromium and zinc were detected in SB-10 at 2.8, 4.6, and 6.9 milligrams per kilogram (mg/kg) dry weight, respectively. SB-11 contained chromium and zinc at 1.3 and 3.9 mg/kg, respectively.

#### 4.2.2 Deep Soil Samples

Samples collected at sample locations SB-17 through SB-23 (rinsate pond area) were analyzed for total volatile organics (Method 8010/8020), semivolatile organics, chlorinated pesticides, and PCB's (Method 8270), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). SB-17 and 18, and SB-22 and 23 were sampled at two depth intervals: 4.5 - 5.0 feet, and 7.5 - 8.0 feet.

SB-27 (septic tank A area), SB-29 (septic tank B area) and SB-31 (septic tank C area) were sampled at a single depth interval of 4.5 - 5.0 feet. SB-29 and 31 were analyzed for total volatile organics, semivolatile organics, chlorinated pesticides, PCB's, arsenic, chromium, and zinc. SB-27 was analyzed for arsenic only. The results of sample analysis for this group of soil samples is given in Table 4-4. Laboratory data are presented in Appendix C.

See  
Table  
4-4

All rinsate pond area samples contained petroleum-type volatile organics (ethylbenzene, toluene, and xylene). SB-17A, 17B, 18A, 19, 21, 22A, and 22B also contained volatile organics. Boring locations 22 and 23 contain total volatiles two to three orders of magnitude above the others. The highest level detected was SB-23B which contained xylene at 1,900,000 µg/kg. Low levels of xylene were also found in a duplicate sample of SB-29 (septic tank B area, 24 µg/kg) and SB-31 (septic tank C area, 56 µg/kg).

Table 4-4. Chevron Orlando Site Assessment  
Deep Soil Sample Analytical Results  
September, 1990

Parameter	Units	Sample Number														
		SB-17A	SB-17B	SB-18A	SB-18B	SB-19	SB-20	SB-21	SB-22A	SB-22B	SB-23A	SB-23B	SB-27	SB-29	DUP-29	SB-31
Depth	Ft.	4.5-5.0	7.5-8.0	4.5-5.0	7.5-8.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	4.5-5.0	7.5-8.0	4.5-5.0	7.5-8.0	4.5-5.0	4.5-5.0	4.5-5.0
Type (Composite or Grab)	--	G	G	G	G	G	G	G	G	G	G	G	G	C	C	C
Chlorobenzene	ug/kg	710	900	610	BDL	760	BDL	1800	130	300	BDL	*	NA	BDL	BDL	BDL
1,3-Dichlorobenzene	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	*	NA	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/kg	3200	3800	BDL	BDL	BDL	BDL	3600	BDL	BDL	BDL	*	NA	BDL	BDL	BDL
Ethylbenzene	ug/kg	2300	360	2100	510	BDL	BDL	1500	2200	64000	14000	*	NA	BDL	BDL	BDL
Toluene	ug/kg	480	220	BDL	BDL	690	BDL	720	380	490	620	*	NA	BDL	BDL	BDL
Xylenes	ug/kg	1600	4200	10000	3500	19000	26	6200	190000	470000	1000000	1900000	NA	BDL	24	56
4,4'-DDD	ug/kg	68000	48000	17000	21000	180000	*	51000	*	40000	120000	92000	NA	BDL	BDL	BDL
Chlordane	ug/kg	*	*	26000	*	170000	*	*	170000	250000	*	470000	NA	BDL	BDL	BDL
2-Methylnaphthalene	ug/kg	*	*	*	*	*	*	*	*	16000	41000	*	NA	BDL	BDL	BDL
bis(2-Ethylhexyl) phthalate	ug/kg	*	*	*	*	*	*	*	*	*	*	*	NA	BDL	BDL	76000
Chlorpyrifos	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	1300	NA	NA	NA	NA	NA
Demeton-O	ug/kg	62	82	170	170	210	BDL	BDL	220	200	490	1500	NA	NA	NA	NA
Demeton-S	ug/kg	200	220	57	57	1400	BDL	BDL	230	BDL	1100	210	NA	NA	NA	NA
Ethoprop	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	23	NA	NA	NA	NA	NA
Naled	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	50	BDL	680	NA	NA	NA	NA
Phorate	ug/kg	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	28	58	NA	NA	NA	NA
Arsenic	mg/kg	BDL	1.1	BDL	1.6	3.5	BDL	BDL	1.2	1.7	BDL	BDL	1.4	1.3	1.1	BDL
Chromium	mg/kg	6.7	12	4.2	10	13	6.1	3.6	2.9	14	2.7	13	NA	5.4	5	1.4
Zinc	mg/kg	16	3	2.6	4.3	BDL	BDL	BDL	13	52	7.8	7.4	NA	2.8	2.6	BDL

BDL = below detectable limits

NA = not analyzed

\* = detection limit extremely elevated due to matrix interference

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**CHAPTER 4. DATA PRESENTATION**

With the exception of SB-20, all samples from the rinsate pond area contained significant levels of chlorinated pesticides. SB-17A, 17B, 18A, 18B, 19, 21, 22B, 23A, and 23B all contained 4,4'-DDD with the highest detected level in SB-19 (180,000 µg/kg), and the lowest in SB-18A (17,000 µg/kg). Chlordane was detected in SB-18A, 19, 22A, 22B, and 23B. SB-23B exhibited the highest detected level of chlordane (470,000 µg/kg), while SB-18A was lowest (26,000 µg/kg). Other chlorinated pesticides may have been present, but were below elevated detection limits imposed by matrix interference. No chlorinated pesticides were detected in the septic tank areas.

Rinsate pond area samples exhibited elevated detection limits for all Method 8270 analytes, and the presence of semivolatile organics may be masked by matrix interference in this area. 2-Methylnaphthalene was detected in SB-22B (16,000 µg/kg) and SB-23A (41,000 µg/kg). SB-31 (septic tank C area) contained bis(2-ethylhexyl) phthalate at 76,000 µg/kg.

Organophosphate pesticides were detected in all rinsate pond area samples except SB-20 and 21. Demeton-O and demeton-S were detected in all samples with detected organophosphates, with highest detections in SB-19 (demeton-S, 1,400 µg/kg) and SB-23B (demeton-O, 1,500 µg/kg). Naled was detected in SB-22B (50 µg/kg) and SB-23B (680 µg/kg). Phorate was detected in SB-23A (28 µg/kg) and SB-23B (58 µg/kg).

SB-23B also contained chlorpyrifos (1,300 µg/kg) and ethoprop (23 µg/kg). The laboratory performing the analysis indicated that additional organophosphates not included in Method 8140, predominantly ethion, were also present in the rinsate pond area samples.

Chlorinated herbicides were not detected.

Arsenic was detected in SB-17B, 18B, 19, 22A, 22B, 27, and 29 with the highest level detected in SB-19 (3.5 mg/kg). Chromium was detected in all samples, with a maximum of 14 mg/kg in SB-22B. Zinc was detected in all samples except SB-19, 20, 21, and 31. SB-17 contained 16 mg/kg, the highest level detected.

#### 4.2.3 Rail Spur Area

Samples collected in the rail spur area, SB-1, SB-2, SB-4 through SB-8, and SB-35, were analyzed for total volatile organics (Method 8010/8020), semivolatile organics (Method 8270), organochlorine pesticides and PCB's (Method 8080) organophosphate pesticides (Method 8140), arsenic (Method 7060), chromium, and zinc (Method 6010). SB-1, 2, 6, 7, and 8 were sampled from a depth interval of 0.0 - 0.5 feet. SB-4 and 5 were sampled from two depth intervals, 0.0 - 0.5 feet and 1.5 - 2.0 feet. SB-3 was not sampled for reasons described in Chapter 1. The results of this sampling are given in Table 4-5. Laboratory data are presented Appendix C.

See  
Table  
4-5

Table 4-5. Chevron Orlando Site Assessment  
 Rail Spur Area Soil Sample Analytical Results  
 September, 1990

Parameter	Units	Sample Number									
		SB-01	SB-02	SB-04A	SB-04B	SB-05A	SB-05B	SB-06	SB-07	SB-08	SB-35
Depth	Ft.	0-0.5	0-0.5	0-0.5	1.5-2	0-0.5	1.5-2	0-0.5	0-0.5	0-0.5	0-0.5
Type (Composite or Grab)	--	G	G	G	G	G	G	G	G	G	G
Chlorobenzene	ug/kg	BDL	1400	BDL	580	BDL	BDL	BDL	BDL	BDL	BDL
1,2-Dichlorobenzene	ug/kg	BDL	12000	570	970	BDL	BDL	BDL	BDL	BDL	BDL
1,3-Dichlorobenzene	ug/kg	BDL	840	120	140	BDL	BDL	BDL	BDL	BDL	BDL
1,4-Dichlorobenzene	ug/kg	BDL	28000	1500	2800	BDL	380	BDL	BDL	BDL	BDL
Ethylbenzene	ug/kg	BDL	BDL	7.7	1500	BDL	BDL	BDL	BDL	BDL	BDL
Xylenes	ug/kg	BDL	57000	7.7	1100	BDL	BDL	BDL	BDL	BDL	BDL
bis(2-Ethylhexyl)phthalate	ug/kg	BDL	610	*	*	*	350	*	*	*	BDL
gamma-BHC	ug/kg	550	BDL	76000	*	*	BDL	*	*	*	BDL
delta-BHC	ug/kg	10000	2500	130000	*	*	BDL	*	320000	*	BDL
beta-BHC	ug/kg	11000	1700	48000	*	*	BDL	*	81000	*	BDL
alpha-BHC	ug/kg	420	BDL	2100000	*	*	BDL	*	72000	*	BDL
Heptachlor	ug/kg	BDL	580	*	*	*	BDL	*	*	*	BDL
Aldrin	ug/kg	BDL	BDL	*	*	5100	BDL	*	*	*	BDL
Dieldrin	ug/kg	BDL	1400	*	*	3500	BDL	*	*	*	380
4,4'-DDE	ug/kg	1400	2300	40000	*	7700	BDL	14000	160000	*	BDL
4,4'-DDD	ug/kg	2200	1400	490000	56000	15000	BDL	18000	1600000	*	BDL
4,4'-DDT	ug/kg	4800	10000	*	*	*	BDL	13000	1800000	*	BDL
Chlordane	ug/kg	8200	13000	1400000	*	18000	BDL	*	160000	5100	43000
Ethion	ug/kg	BDL	BDL	140	650	BDL	BDL	BDL	BDL	BDL	BDL
Arsenic	mg/kg	13	6.3	11	27	38	31	22	86	BDL	BDL
Chromium	mg/kg	2.3	2	16	2.4	14	2.6	18	26	6.4	1.5
Zinc	mg/kg	15	BDL	410	3.7	38	3.1	9.7	200	58	8.1

BDL = below detectable limits

\* = detection limit extremely elevated due to matrix interference

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**CHAPTER 4. DATA PRESENTATION**

Xylene, and chlorinated aromatics were detected in SB-2 and both depth intervals at SB-4. The highest concentrations were detected in SB-2 with xylene at 57,000 µg/kg, chlorobenzene at 1,400 µg/kg, and dichlorobenzenes at a total of 40,840 µg/kg. Both depth intervals for SB-4 were lower by at least one order of magnitude. Ethylbenzene was also detected in both depth intervals of SB-4.

Organochlorine pesticides were detected in all rail spur area samples. BHC isomers were detected in SB-1 (21,970 µg/kg total), SB-2 (4,200 µg/kg total), SB-4, 0.0 - 0.5 foot interval (2,354,000 µg/kg total), and SB-7 (473,000 µg/kg total). Heptachlor was detected in SB-2 (580 µg/kg). Aldrin was detected in SB-5, 0.0 - 0.5 foot interval, (5,100 µg/kg). Dieldrin was detected in SB-2 (1,400 µg/kg), SB-5, 0.0 - 0.5 foot interval (3,500 µg/kg), and SB-35 (380 µg/kg). 4,4'-DDE, 4,4'-DDD, and 4,4'-DDT were detected in SB-1 (1,400, 2,200, and 8,200 µg/kg), SB-2 (2,300, 1,400, and 10,000 µg/kg), SB-6 (14,000, 18,000, and 13,000 µg/kg), and SB-7 (160,000, 1,600,000, and 1,800,000 µg/kg). 4,4'-DDE and 4,4'-DDD were also detected in SB-4, 0.0 - 0.5 foot interval (40,000 and 490,000 µg/kg), and SB-5, 0.0 - 0.5 foot interval (7,700 and 15,000 µg/kg).

The only organochlorine pesticide detected in the 1.5 - 2.0 foot interval was 4,4'-DDD in SB-4 (56,000 µg/kg), however, matrix interference may have confounded detection of other compounds in this boring and in SB-5, 6, 7, and 8.

Ethion was the only organophosphate pesticide detected in this area, and was detected in SB-4 only at both depth intervals (140 µg/kg at 0.0 - 0.5 foot interval and 650 µg/kg at 1.5 - 2.0 foot interval). The laboratory has indicated that other organophosphates not analyzed in Method 8140 may also be present.

#### 4.2.4 Underground Storage Tank

Six split spoon borings (TT-1 through TT-6) were constructed to a depth of ten feet around the underground storage tank. These borings were to be screened for organic vapor using an OVA. However, the OVA was not functioning properly, so two samples were selected (one from each end of the tank) for analysis as an alternate approach to investigating for possible petroleum hydrocarbon contamination. The two samples were analyzed for volatile aromatic hydrocarbons (Method 8020) and total petroleum hydrocarbons (Method 418.1). No analytes were detected in either sample.

### 4.3 SEDIMENT SAMPLE RESULTS

One composite sample of sediment was collected from the stormwater retention pond located on property adjacent to the western boundary of the site and approximately 150 feet north of the rail road spur. Four subsamples were collected on a transect across the long axis of the pond, and analyzed for volatile organic compounds (Method 8010/8020), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). 2,4,5-TP (Silvex) was detected at 25 µg/kg.

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**CHAPTER 4. DATA PRESENTATION**

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Chromium and zinc were detected at 4.9 and 4.1 mg/kg. All other analytes were below detectable limits.

#### 4.4 GROUNDWATER SAMPLE RESULTS

All wells were sampled and analyzed for volatile organic compounds (Method 8010/8020), semivolatile organic compounds (Method 8270), organochlorine pesticides and PCB's (Method 8080), organophosphate pesticides (Method 8140), chlorinated herbicides (Method 8150), arsenic (Method 7060), chromium and zinc (Method 6010). Analytical results are given in Table 4-6. Laboratory data are presented in Appendix C.

See  
Table  
4-6

Volatile organic compounds, predominantly xylene, were detected in monitor wells E, F, G, H, I, J, K, L, N, and O. Wells F, H, J, L, and N contained chlorinated volatiles. Highest concentrations of total volatiles were detected in monitor well L (6,479 micrograms per liter - ug/l). Monitor wells H and J contained benzene concentrations (97 and 62 ug/l, respectively), and 1,1-dichloroethene concentrations (48 and 120 ug/l respectively) in excess of Florida drinking water standards. Monitor well J also contained 1,2-dichloroethane at 56 ug/l, exceeding Florida drinking water standards.

Naphthalene was detected in MW-E (26 ug/l). Isopherone was detected in MW-H (56 ug/l), MW-J (44 ug/l), and MW-L (56 ug/l). 2,4-dimethylphenol was detected in MW-H (47 ug/l), and phenol was detected in MW-H and L at 46 ug/l for each.

With the exception of samples collected from MW-A and K, organochlorine pesticides, predominantly BHC isomers, were detected in all groundwater samples. Maximum total concentrations were detected in MW-O at 111 ug/l. MW-J and O contained concentrations of gamma-BHC (lindane) in excess of Florida drinking water standards (18 and 17 ug/l, respectively). Endrin was also detected in excess of these standards in MW-H (1.5 ug/l) and MW-J (1.1 ug/l).

Demeton-O, an organophosphate pesticide, was detected in seven of the fourteen monitor wells, at concentrations ranging from 1.1 ug/l to 130 ug/l. Parathion and methyl parathion were detected in MW-P, at 110 ug/l and 0.16 ug/l, respectively.

Chlorinated herbicides were not detected in any samples.

Arsenic concentrations exceeded Florida drinking water standards in MW-H (0.092 mg/l) and MW-L (0.082 mg/l). Chromium concentrations were in excess of these standards in MW-G (0.17 mg/l), MW-H (0.051 mg/l), and MW-P (0.059 mg/l). Total metals concentrations were highest in samples collected from MW-G at 0.19 mg/l.

Table 4-6. Chevron Orlando Site Assessment  
Groundwater Sample Analytical Results  
September, 1990

Parameter	Units	Well Identification																	
		MW-A	DUP-A	MW-D	DUP-D	MW-E	MW-F	MW-G	MW-H	DUP-H	MW-I	MW-J	MW-K	MW-L	MW-M	MW-N	MW-O	MW-P	
Screen Interval	Ft. BLS	7-17	--	7-17	--	7-17	22-32	23-33	7-17	--	7-17	7-17	23-33	7-17	12-22	7-17	7-17	12-22	
pH	units	5.83	NA	6.42	NA	5.78	5.58	5.76	7.69	NA	6.08	7.03	5.4	6.99	6.15	6.12	5.52	4.99	
Conductivity	umhos	195	NA	140	NA	485	150	260	2600	NA	130	1750	260	1650	850	190	330	185	
Temperature	Celsius	29.2	NA	26.3	NA	28.3	26.6	26.6	27.8	NA	27.7	27.3	26.2	26.3	27.8	27.1	26.9	27	
Benzene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	97	54	BDL	62	BDL	BDL	BDL	BDL	BDL	BDL	
Toluene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	76	54	BDL	88	BDL	BDL	BDL	BDL	BDL	BDL	
Xylene	ug/l	BDL	BDL	BDL	BDL	2500	15	920	1300	640	730	750	89	5500	BDL	BDL	420	BDL	
Ethylbenzene	ug/l	BDL	BDL	BDL	BDL	BDL	5.7	180	220	130	350	140	39	930	BDL	1.5	BDL	BDL	
Chlorobenzene	ug/l	BDL	BDL	BDL	BDL	BDL	5.1	BDL	130	120	BDL	130	BDL	BDL	BDL	2.7	BDL	BDL	
Chloroform	ug/l	BDL	BDL	BDL	BDL	BDL	2.8	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,4-Dichlorobenzene	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	72	80	BDL	150	BDL	49	BDL	1.5	BDL	BDL	
1,1-Dichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	1.2	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,2-Dichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	56	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1-Dichloroethene	ug/l	BDL	BDL	BDL	BDL	BDL	1.8	BDL	48	55	BDL	120	BDL	BDL	BDL	BDL	BDL	BDL	
Methylene Chloride	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	290	68	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
1,1,2-Trichloroethane	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	220	39	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Aldrin	ug/l	BDL	BDL	0.014	0.014	*	*	*	*	*	*	*	*	1.7	BDL	*	BDL	13	
a-BHC	ug/l	BDL	BDL	BDL	BDL	*	5.1	0.37	2.4	2.8	*	*	*	2.1	0.027	3.6	21	4.5	
b-BHC	ug/l	BDL	BDL	BDL	BDL	0.86	2.1	0.14	7.7	8.2	0.36	*	*	1.4	0.096	2.9	52	22	
d-BHC	ug/l	BDL	BDL	BDL	BDL	*	4.2	0.29	*	*	0.23	*	*	*	0.02	5.8	21	5.9	
g-BHC	ug/l	BDL	BDL	BDL	BDL	*	0.44	0.18	1.7	1.7	*	*	*	*	0.044	0.82	17	1.5	
4,4'-DDD	ug/l	BDL	BDL	BDL	BDL	*	*	*	2.6	5.5	*	*	*	*	*	*	*	*	
Dieldrin	ug/l	BDL	BDL	BDL	BDL	*	0.67	*	*	*	0.57	*	*	*	0.071	*	*	*	
Endrin	ug/l	BDL	BDL	BDL	BDL	*	*	*	*	*	*	*	*	*	0.021	*	*	*	
Endosulfan I	ug/l	BDL	BDL	BDL	BDL	0.025	*	0.15	0.3	*	1.5	*	*	*	*	*	*	*	
Heptachlor	ug/l	BDL	BDL	BDL	BDL	*	0.26	*	*	*	*	*	*	*	*	0.13	*	*	

BDL = below detectable limits

NA = not analyzed

\* = detection limit extremely elevated due to matrix interference

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Table 4-6. Chevron Orlando Site Assessment  
Groundwater Sample Analytical Results (Continued)  
September, 1990

Parameter	Units	Well Identification																	
		MW-A	DUP-A	MW-D	DUP-D	MW-E	MW-F	MW-G	MW-H	DUP-H	MW-I	MW-J	MW-K	MW-L	MW-M	MW-N	MW-O	MW-P	
Naphthalene	ug/l	BDL	BDL	BDL	BDL	26	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	
Isophorone	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	56	55	BDL	44	BDL	56	BDL	BDL	BDL	BDL	BDL	
2,4-Dimethylphenol	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	47	BDL									
Phenol	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	46	46	BDL	BDL	BDL	46	BDL	BDL	BDL	BDL	
Demeton-O	ug/l	BDL	BDL	BDL	BDL	2.5	BDL	BDL	130	22	BDL	46	BDL	21	BDL	BDL	1.1	BDL	
Ethyl Parathion	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	110		
Methyl Parathion	ug/l	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	BDL	0.16	
Arsenic	mg/l	BDL	BDL	BDL	BDL	BDL	BDL	0.03	0.092	BDL	0.025	BDL	0.082	BDL	BDL	BDL	BDL	BDL	
Chromium	mg/l	0.1	0.043	0.011	0.011	0.015	BDL	0.17	0.011	0.051	BDL	0.031	BDL	0.038	BDL	BDL	BDL	0.059	
Zinc	mg/l	0.054	0.12	0.035	0.052	0.025	BDL	0.02	BDL	0.027	BDL	0.041	0.024	BDL	0.027	0.042	0.044	0.053	

BDL = below detectable limits

NA = not analyzed

\* = detection limit extremely elevated due to matrix interference

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## CHAPTER 5.0

### DATA EVALUATION

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#### 5.1 SITE HYDROGEOLOGY

As presented in Chapter 4, the hydrogeologic characteristics of the site were investigated to provide the data necessary to evaluate contaminant transport mechanisms. This investigation included characterization of site geology, determination of water level elevations, and characterization of aquifer hydraulic conductivities.

Based on the water level elevations measured in each well, the surficial aquifer unit on site appears to represent a shallow unconfined aquifer and a deeper semi-confined unit (probably the top of the Hawthorn formation). The groundwater flow direction in the unconfined unit is in a northeasterly direction, with a gradient of approximately 0.006. Groundwater flow in the semi-confined unit appears to be in a northerly direction. However, additional water level elevation data for this unit are required to thoroughly characterize the groundwater flow regime.

Using the Darcy equation, the linear groundwater flow velocity may be calculated from the average measured hydraulic conductivity (3 feet per day), the average gradient (0.006) and literature values for effective porosity (0.20), as follows:

$$V = \frac{ki}{n}$$

where  $V$  = velocity in feet per day  
 $k$  = hydraulic conductivity in feet per day  
 $i$  = gradient (unitless), and  
 $n$  = porosity (unitless).

Substituting the values presented above, the average value of groundwater flow velocity beneath the site is 0.09 feet per day, or approximately 33 feet per year.

The groundwater gradient in the deeper unit is approximately 0.02. Using the same values for hydraulic conductivity and effective porosity, the average groundwater flow velocity in the deeper unit is 0.3 feet per day, or 109.5 feet per year. As previously mentioned, additional data are required to fully characterize the groundwater flow regime in this unit.

**CHAPTER 5. DATA EVALUATION****5.2 SOIL SAMPLING DATA EVALUATION**

Soil sampling analytical results and contaminant distributions were evaluated and are discussed by contaminant type. These broad categories of contaminant type are:

- Volatile Organics,
- Semivolatile Organics,
- Organochlorine Pesticides,
- Organophosphate Pesticides,
- Chlorinated Herbicides, and
- Heavy Metals.

**5.2.1 Volatile Organics Distribution**

The distribution of volatile organic compound contamination in the soil at the site is presented on Figure 5-1. Volatile organics were detected in the area of the rinsate ponds, the area adjacent to and east of the rinsate ponds, the rail spur area, and barrel storage area. Low levels of xylene were also detected in septic tank drainfields B and C.

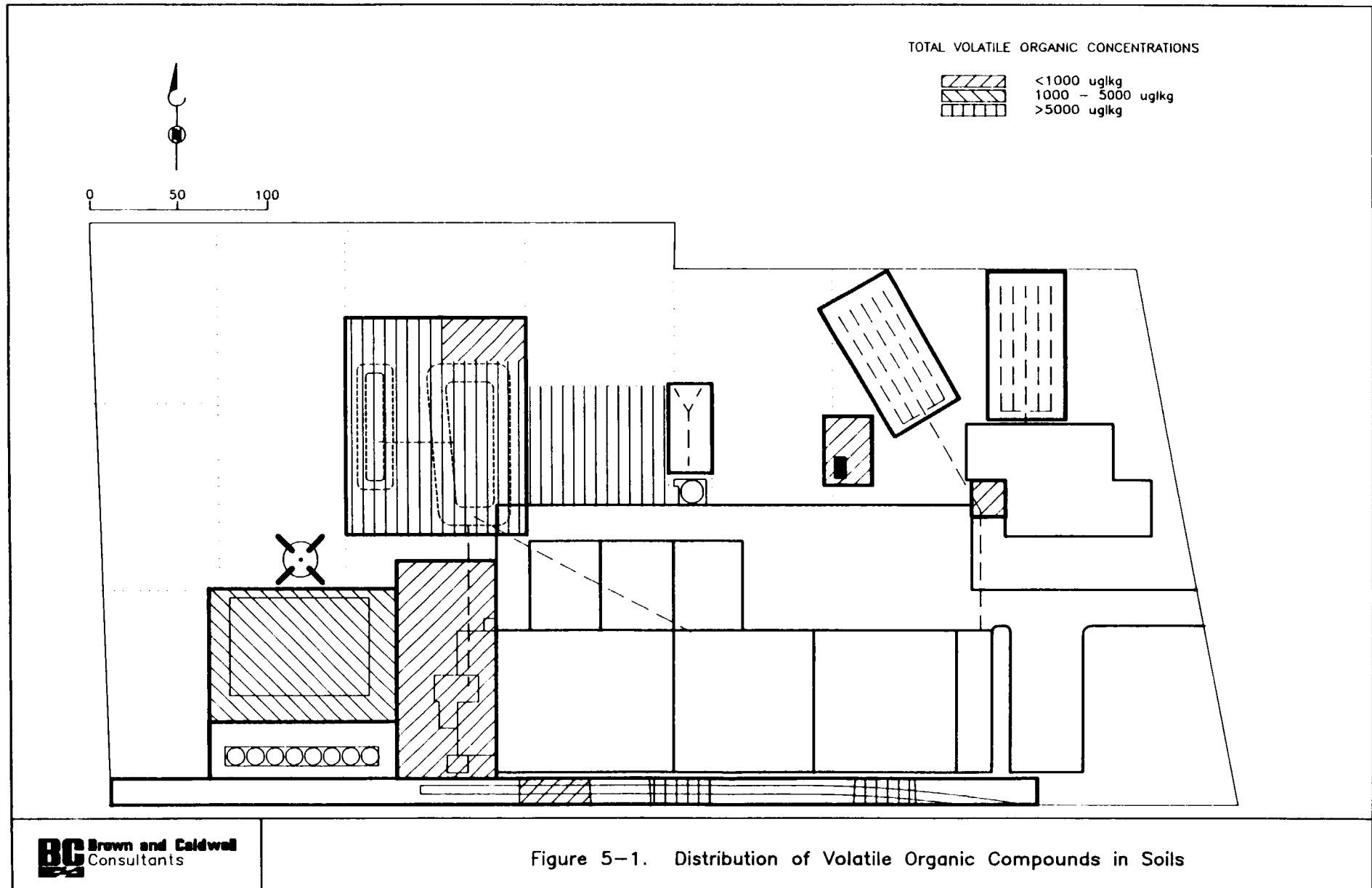
See  
Figure  
5-1

Volatile organic contamination in the rinsate pond area was predominantly from xylene. Ethylbenzene, toluene, chlorobenzene, and 1,4-dichlorobenzene were also present. Concentrations of contaminants generally increased by an order of magnitude with depth in the eastern portion of the pond area.

The area adjacent and to the east of the rinsate pond exhibited a pattern of volatile organic contamination similar to the rinsate pond area. This area corresponds to a zone of high non-ionic contamination detected in the GPR survey, and is the location of a vertical above-ground storage tank that can be seen in aerial photographs taken in 1969 and 1973.

Volatile organic contaminants in the rail spur area were predominantly xylene and the chlorobenzenes, and appear to increase with depth. Sample locations that did not show volatile organic contamination at the surface may have elevated concentrations at depth.

Volatile organic contamination in the barrel storage area displayed a distribution pattern similar to the rinsate pond and adjacent area.



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**CHAPTER 5. DATA EVALUATION****5.2.2 Semivolatile Organics Distribution**

Semivolatile organics were not detected in soils throughout the site. Elevated detection limits caused by matrix interference may have affected determination of these contaminants. Methylnaphthalene was detected in two samples from the rinsate pond area in moderately high concentrations. These samples may reflect a localized spill of kerosene fuel or other petroleum product. Bis(2-ethylhexyl)phthalate was detected in septic tank drainfield C and at two locations in the rail spur area.

**5.2.3 Organochlorine Pesticides**

Organochlorine pesticide distribution is shown on Figure 5-2. Organochlorine pesticides, predominantly chlordane and gamma-BHC, were found to be widespread throughout the western and northern sections of the site and along the rail spur. High concentrations were found in and around the rinsate pond area and adjacent to the floor drain outlet along the rail spur. Other organochlorines detected in these areas of the site were heptachlor, endosulfan I, dieldrin, DDT, DDD, DDE, and endrin. Organochlorines were also high in the rail spur area with additional detection of alpha-, beta-, delta-, and gamma-BHC. Aldrin was also detected at less significant concentrations.

See  
Figure  
5-2

**5.2.4 Organophosphate Pesticides**

Organophosphate pesticide distribution is shown of Figure 5-3. Although the organophosphates are not as widely distributed as the organochlorine pesticides, high concentrations of organophosphate pesticides were found in and around the rinsate pond area. Less significant levels were detected in the rail spur and barrel storage area.

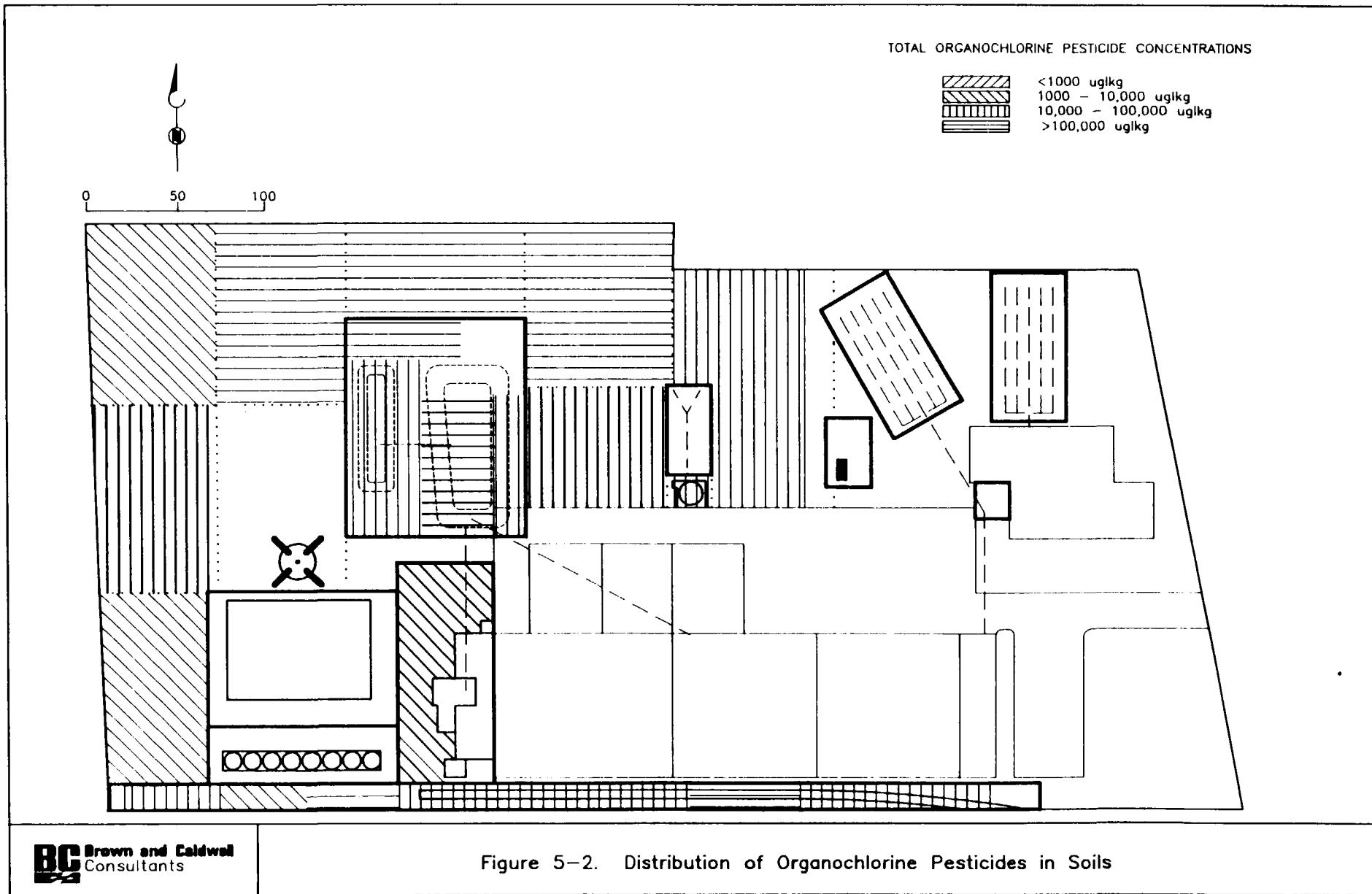
See  
Figure  
5-3

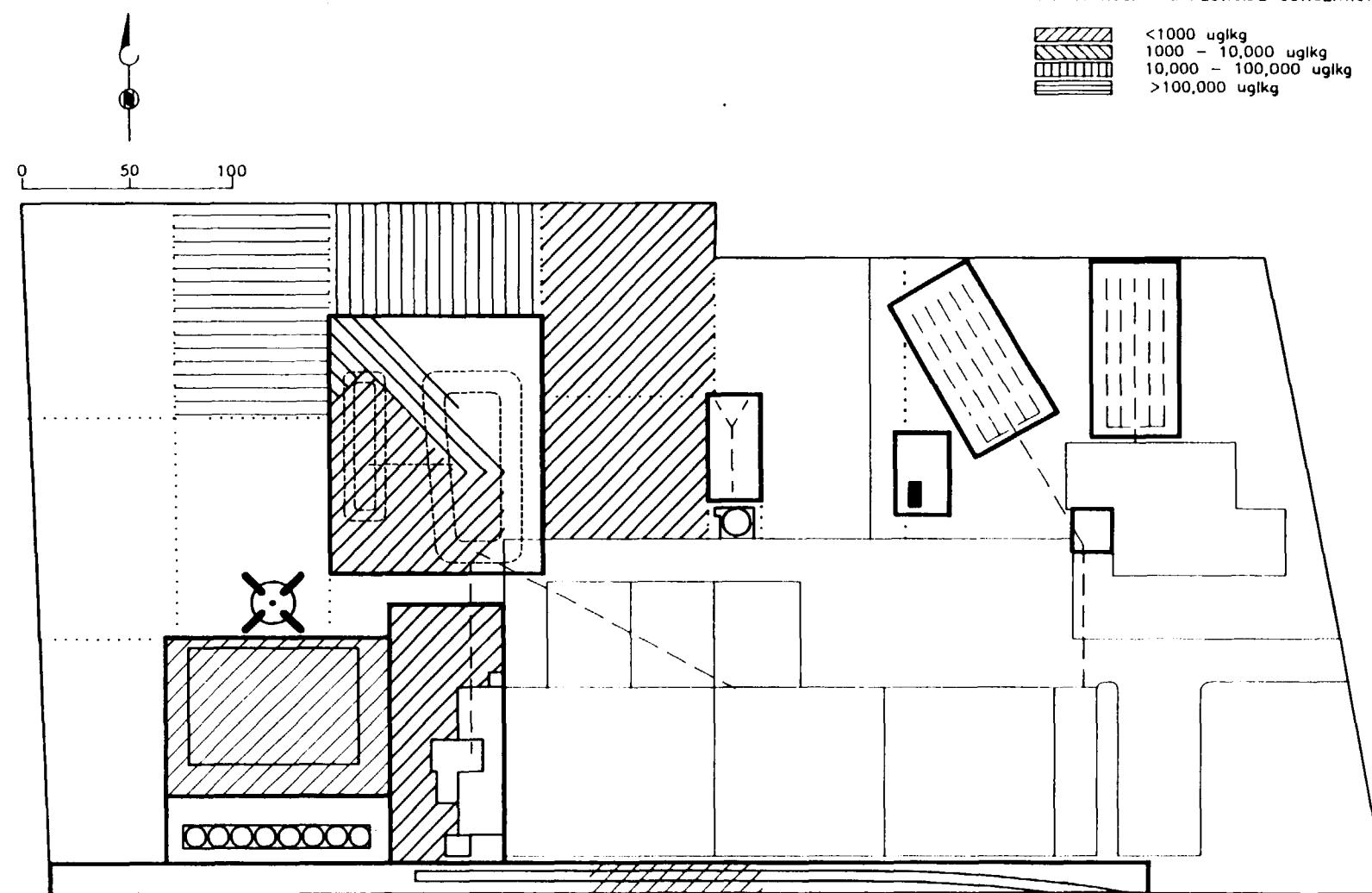
Communications with the contracted laboratory indicate that organophosphate pesticides not included in Method 8140, such as ethion and malathion, exist in estimated concentrations as high as 10,000 µg/kg. Ethion concentrations were calculated by the laboratory for the shallow composite samples and the rail spur area, and ethion appeared to be the predominant organophosphate contaminant.

**5.2.5 Chlorinated Herbicides**

Chlorinated herbicides were not detected at the site. Matrix interference elevated detection limits in all samples analyzed by Method 8150. A single sediment sample collected from a retention pond that receives runoff from the site contained silvex at 25 µg/kg.

2 2 0272





**CHAPTER 5. DATA EVALUATION****5.2.6 Heavy Metals**

Metals analysis was performed on a limited number of samples restricted to the rinsate pond area, septic tank drainfields, barrel storage area, and rail spur area. With the exception of two sample points in the rail spur area and one sample point in the rinsate pond, total metals were below 50 mg/kg, with zinc being the predominant metal contaminant. Metals distribution is presented on Figure 5-4.

See  
Figure  
5-4

**5.3 GROUNDWATER DATA EVALUATION**

Groundwater analytical results and contaminant distributions were evaluated separately for the shallow wells (monitor wells A, D, E, H, I, J, L, M, N, O, and P), and the deep wells (wells F, G, and K). The contaminants were evaluated using the same analytical categories as used for soil data evaluation.

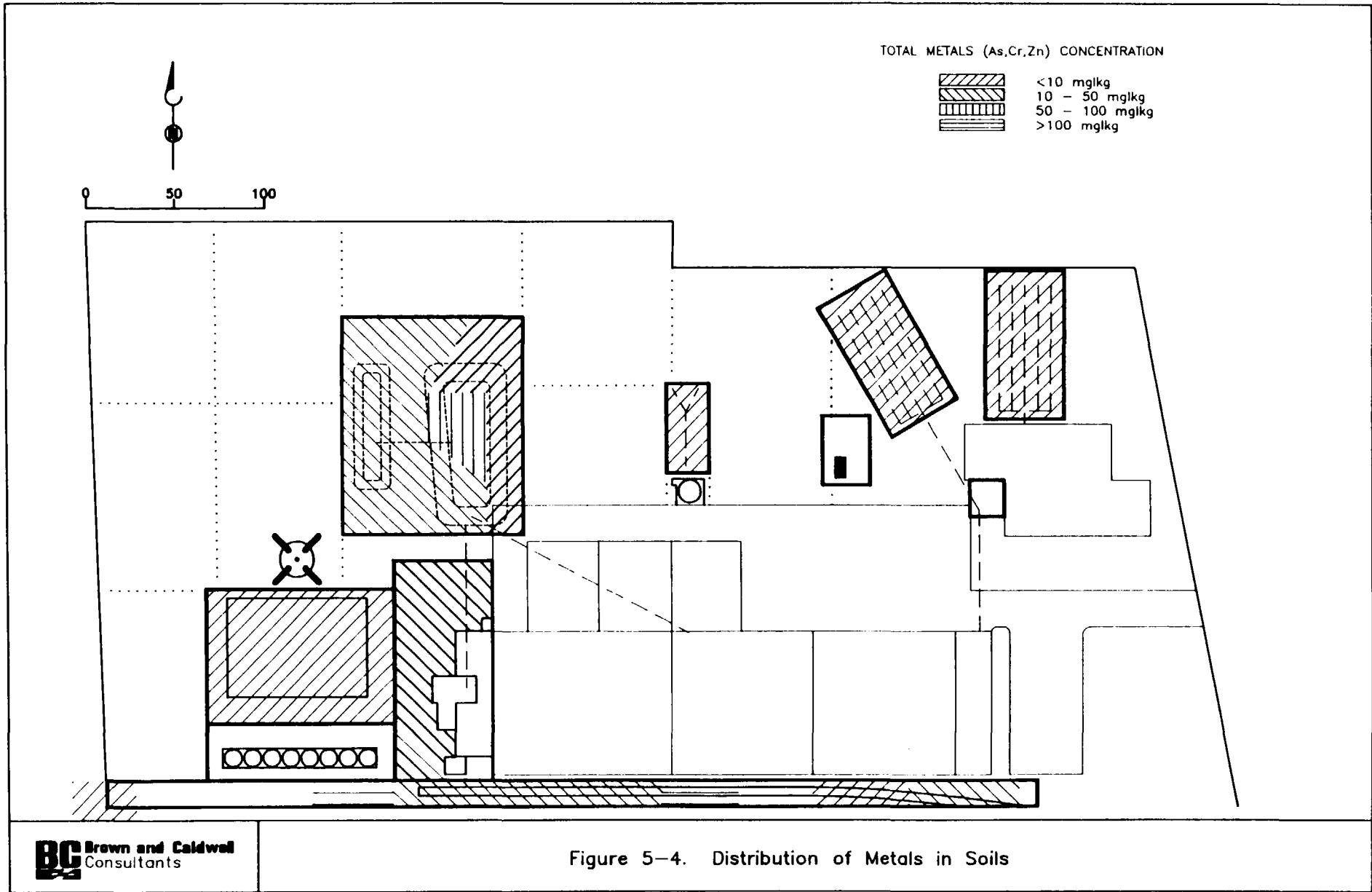
**5.3.1 Volatile Organics Distribution**

Volatile organic compounds were detected in the surficial aquifer beneath the central and western portions of the site (Figures 5-5 and 5-6). The distribution and composition of the volatile organics suggests three potential contaminant release scenarios. The predominant volatile contaminant in the groundwater is xylene, with the highest concentrations in MW-L (5500 µg/kg) and MW-E (2500 µg/kg). MW-L is downgradient from the aboveground storage tank identified in aerial photographs, and corresponds with an area of high non-ionic response in the GPR survey. MW-E is adjacent to the drum storage area. MW-K, the deep well in the MW-K, L cluster has significantly lower concentrations of xylene, but demonstrates that the xylene is migrating vertically downward.

See  
Figure  
5-5 and  
5-6

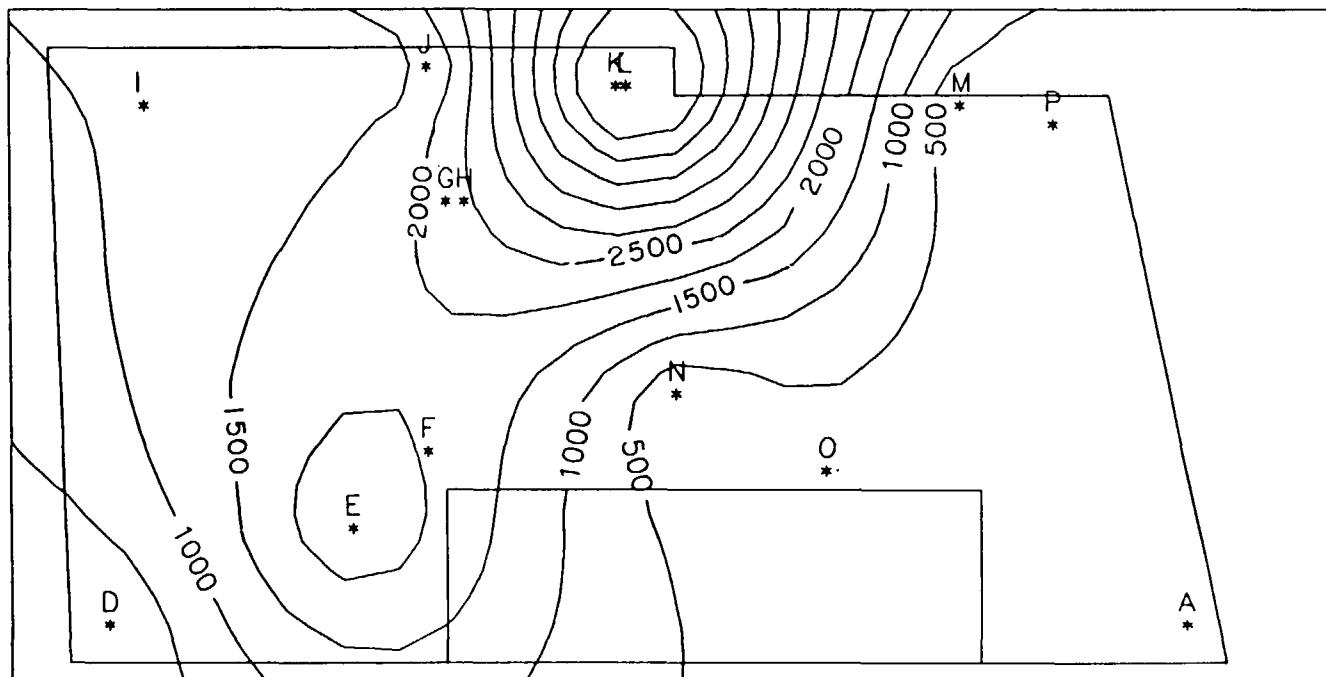
The suite of volatile compounds associated with gasoline were detected in samples from monitor wells H and J presumably reflecting a gasoline spill. Ethylbenzene was detected (along with xylene) in MW-L, K, I, and G, but the other gasoline-type volatiles were not detected.

Purgeable halocarbons were detected in highest concentration in MW-H, with lower concentrations in MW-N, L, J, and F. The predominant source area for the purgeable halocarbons appears to be the rinsate pond, with minor contribution from the formulation building area.

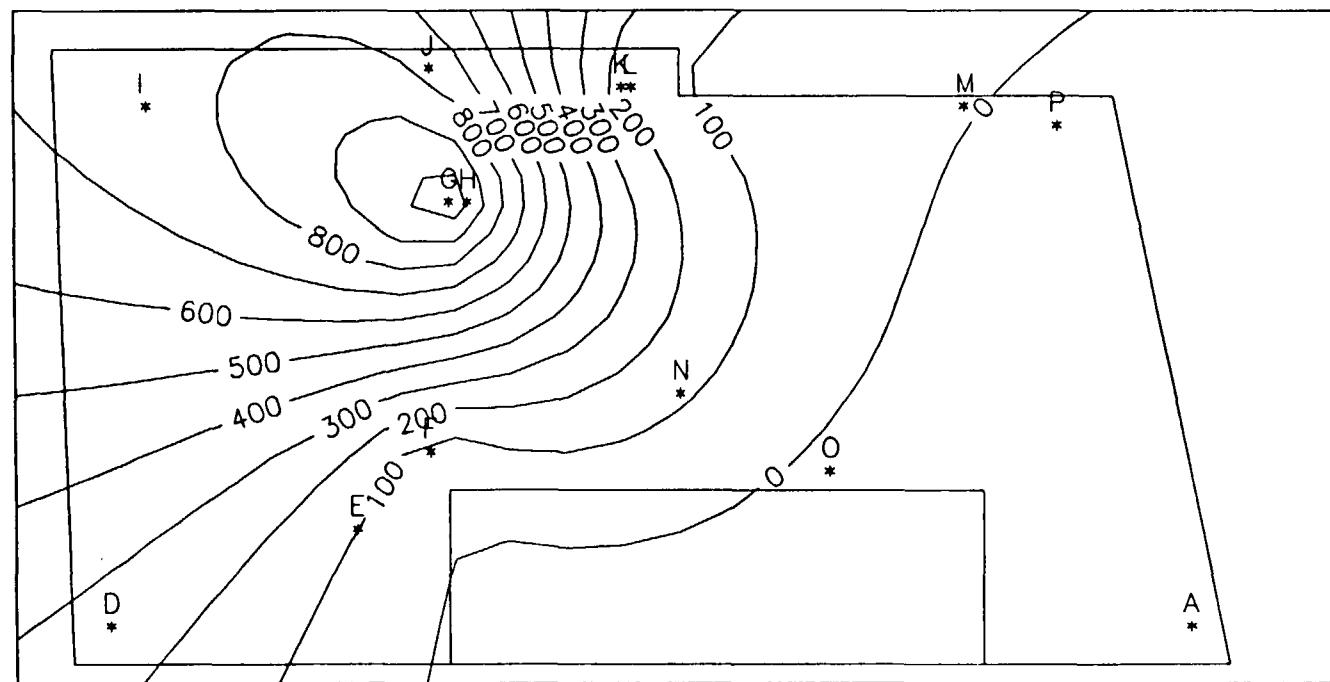


220276

~ 1500 ~ = VOLATILE ORGANIC CONCENTRATIONS IN ug/l



~ 100~ = TOTAL VOLATILES CONCENTRATION IN ug/l



**CHAPTER 5. DATA EVALUATION****5.3.2 Semivolatile Organics Distribution**

Semivolatile organics were detected in four wells screened in the shallow zone only, and appear to be centered in the approximate location of the rinsate ponds. Total semivolatile distribution is shown on Figure 5-7.

See  
Figure  
5-7

**5.3.3 Organochlorine Pesticide Distribution**

Organochlorine pesticides in the shallow zone appear to be wide spread across the site, with two distinct lobes. One lobe, located in the area north of the rinsate pond corresponds to areas of high soil contamination. The second lobe, located in the eastern portion of the site, appears to be centered around MW-O. This area is covered with concrete/asphalt, and soil sampling was not conducted over much of this area. Soil samples collected in the septic tank area adjacent to MW-M and MW-P did not contain organochlorine pesticides. Organochlorine distribution in the shallow groundwater unit is given on Figure 5-8.

See  
Figure  
5-8

The primary groundwater contaminants are the BHC isomers, with minor contributions from aldrin, 4,4'-DDD, endrin, endosulfan I, and heptachlor. Florida Drinking Water Standards are available for gamma-BHC (lindane) and endrin, at 4 µg/l and 0.2 µg/l, respectively. The Drinking Water Standard for lindane was exceeded in wells J and O, and for endrin in wells J, M, and the duplicate sample from well H. Organochlorine pesticides were also detected in two of the three deeper wells, confirming downward vertical migration of these contaminants, as shown on Figure 5-9.

See  
Figure  
5-9

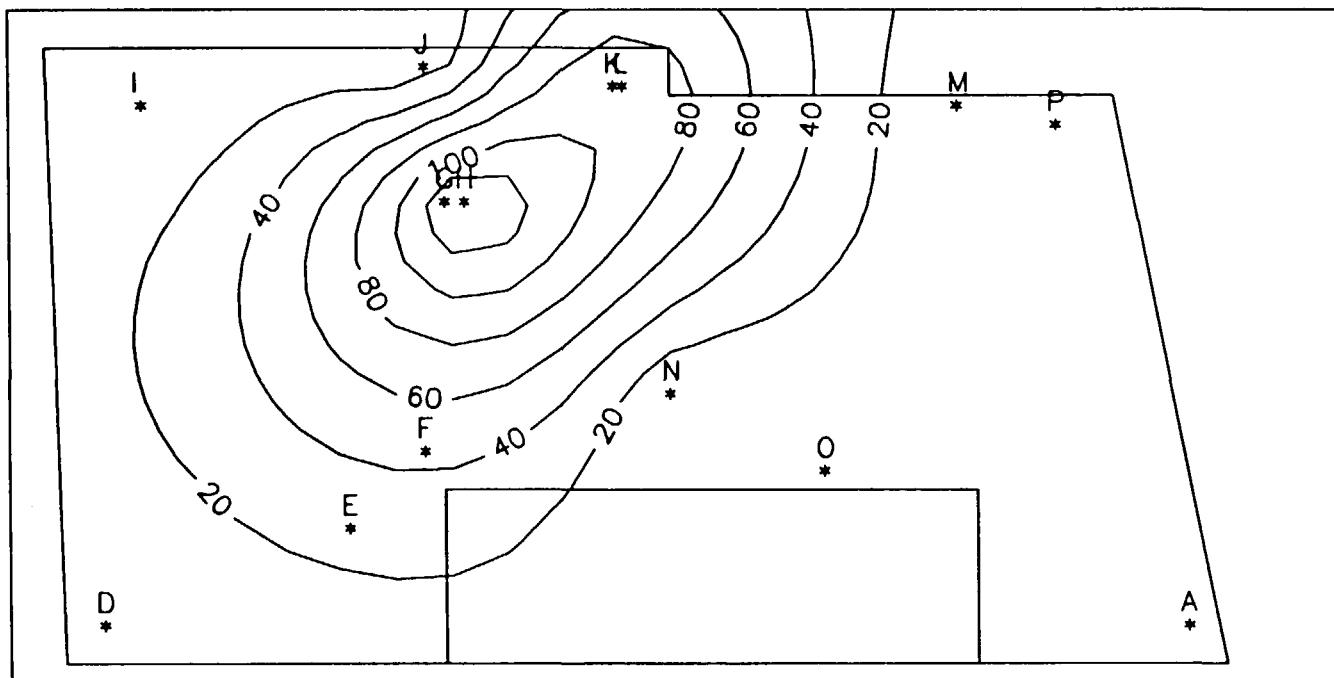
The rinsate pond and the rail spur area are the two most apparent source areas for the BHC isomers. Based on the available data, select organochlorine pesticides appear to be migrating off site in the groundwater in a northerly and northeasterly direction. However, additional off site data are required to determine whether off site migration is occurring. Additional sampling with depth is also required to determine the vertical extent of contaminant migration.

**5.3.4 Organophosphate Pesticide Distribution**

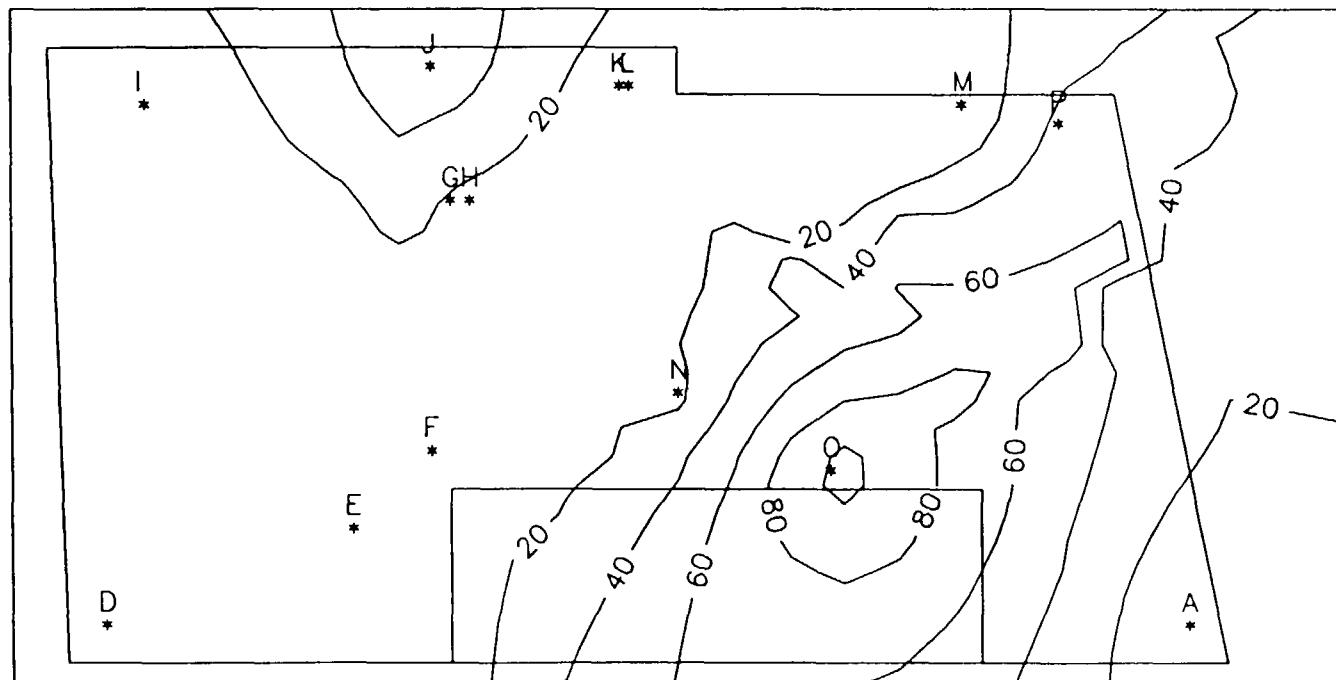
Of the organophosphate pesticides, demeton-O is the predominant groundwater contaminant. The demeton-O distribution is similar to the distribution of organochlorine pesticides, with a plume associated with the rinsate pond, and a plume in the northeast portion of the site. Parathion and methyl parathion were detected in MW-P only, and are probably the result of a parathion spill reported in the northeast portion of the site. This distribution is shown on Figure 5-10.

See  
Figure  
5-10

~ 40 ~ = TOTAL SEMIVOLATILES CONCENTRATIONS IN ug/l

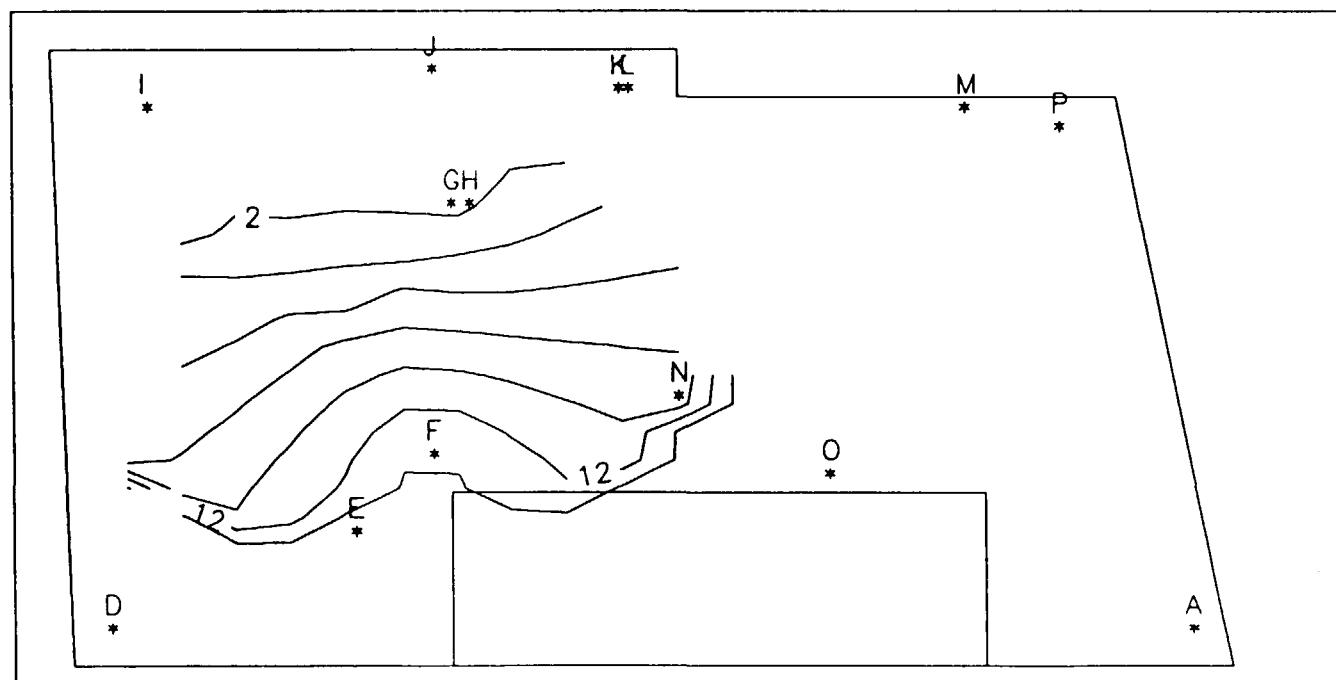


~ 40 ~ = TOTAL ORGANOCHLORINE PESTICIDES CONCENTRATIONS IN ug/l

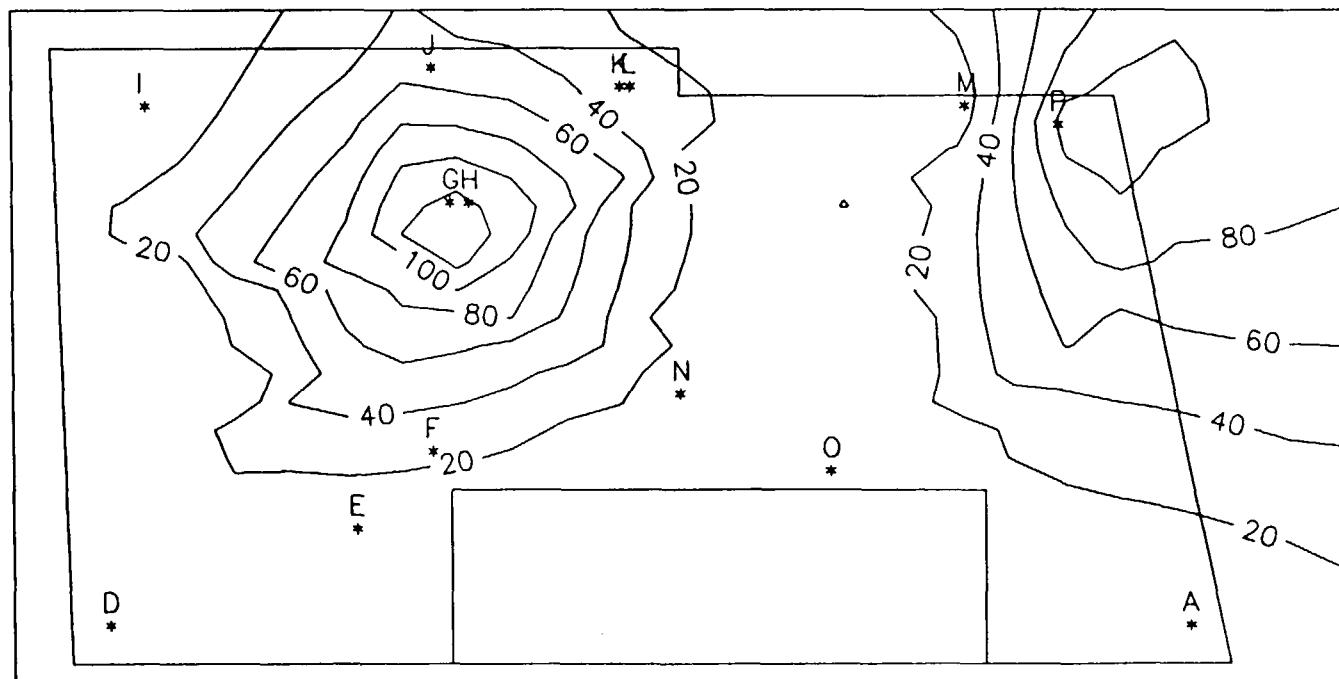


220281

~ 40 ~ = TOTAL ORGANOCHLORINE PESTICIDES CONCENTRATIONS IN ug/l



~ 40 ~ = ORGANOPHOSPHATE PESTICIDE CONCENTRATIONS IN ug/l



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**CHAPTER 5. DATA EVALUATION****5.3.5 Metals Distribution**

The arsenic, chromium, and zinc distribution in the groundwater is sporadic and does not reflect a definitive source area onsite. Arsenic was detected in three shallow wells (MW-H, J, and L) and no deep wells. Chromium was detected in seven shallow wells, with the highest concentration (in the shallow zone) in the southeast corner of the site (MW-A and oil mg/l). Chromium was also detected in MW-G, which may reflect contribution from the rinsate pond. Zinc was detected in 10 monitor wells, but in concentrations well below the drinking water standard.

## CHAPTER 6.0

### ***RECOMMENDATIONS***

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#### **6.1 INTRODUCTION**

Based on the data evaluation presented in Chapter 5.0, additional site characterization is required to fully delineate the extent of soil and groundwater contamination at the site. The results of the site investigation indicate that several pesticides and volatile organic compounds remain in the soils on the site, and that additional soil characterization data are required to develop an effective soil cleanup plan. However, due to the variety and distribution of contaminants present at the site, the performance of a risk assessment is necessary to identify the contaminants of concern and to develop cleanup levels. This information will then be used to design a second soil investigation with the objective of delineating the extent of soil contamination for the contaminants of concern. The results of the risk assessment will also be used to establish cleanup levels for groundwater contaminants for which no standards exist.

The results of the groundwater investigation indicate that there are two plumes of contaminated groundwater which may be migrating offsite. In order to fully delineate the extent of these plumes and to determine whether offsite migration is occurring, additional groundwater characterization is required. The additional groundwater characterization will consist of a soil gas and hydropunch investigation to develop a preliminary map of the plumes, to be followed by the installation and sampling of groundwater monitor wells. Sampling and analysis of selected existing monitor wells will also be performed to better characterize the groundwater contamination.

Specific recommended additional site characterization activities are described in the following sections.

#### **6.2 RISK ASSESSMENT**

As described above, a wide variety of contaminants have been detected in the soils and groundwater at various locations across the site, and additional site characterization will be required to develop an effective site cleanup plan. In addition, because of the diversity and wide distribution of contaminants detected in the soil, it will be necessary to first identify the contaminants of concern and establish cleanup levels based on the health and environmental risks posed by these contaminants. With this information and the sampling data from the initial site investigation, it will be possible to design an additional soil sampling and analysis plan that will more fully delineate the extent of soil contamination.

Therefore, the performance of a risk assessment of the site to identify the contaminants of concern and establish cleanup levels for these contaminants is recommended. The risk

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**CHAPTER 6. RECOMMENDATIONS**

assessment will be performed in accordance with the Risk Assessment Guidance for Superfund (USEPA 1989) to determine the contaminant migration pathways and to estimate the magnitude of actual and/or potential human exposures. Results of the exposure assessment will then be used to define soil and groundwater concentrations that must be attained to protect human health and the environment.

A baseline risk assessment consists of four phases: 1) data collection and evaluation; 2) exposure assessment (EA); 3) toxicity assessment (TA); and 4) risk characterization (RC). The initial data collection and evaluation has been completed, as presented in Chapters 1 through 5 of this report. To complete the risk assessment, a limited amount of additional site characterization data will have to be gathered.

The EA will utilize site specific data to predict the potential for chemicals to reach specific receptor populations. Estimates of contaminant releases and source concentrations will be derived from the chemical analysis of soils and water. This will be followed by identification of the populations potentially exposed and the likely exposure pathways. Finally, quantitative estimates of chemical concentrations at selected exposure points will be made given the measured source concentrations and the identified exposure pathways. Calculations of exposure point concentrations will be based on both the data collected in this phase and on the results of predictive modeling of the fate and transport of selected contaminants.

The relationship between the exposure levels, as determined by the EA, and the risk of adverse health effects is a function of the toxicity values for the compounds of concern (determined from a TA). The TA will act as a screening tool to define the contaminants (the indicator compounds) most important in bracketing the risk associated with the action levels defined for analytes in each of the media.

Using the information generated by the EA and TA, the RC will be performed to evaluate the potential occurrence of adverse health effects. Specifically, the risk to the potentially exposed human population for each contaminant of concern, as a function of the analyte concentration in soil, groundwater, and air, will be estimated in the RC. Using this methodology, it will be possible to determine risk-based cleanup concentrations for the contaminants of concern in soil, groundwater, and air. This information will then be used to design an additional soil sampling and analysis plan to more fully delineate the extent of the contaminants of concern in the soil.

### 6.3 GROUNDWATER INVESTIGATION

The objective of the groundwater investigation is to delineate the vertical and horizontal extent of the two groundwater plumes which were identified onsite. This objective will be accomplished in three steps, to ensure characterization of the entire plume within one period of field activity. The three steps are as follows:

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**CHAPTER 6. RECOMMENDATIONS**

1. **Soil Gas Survey:** Based on the detection of volatile organic compounds in the groundwater, and the fact that the volatile organic compounds are much more mobile in groundwater than the pesticides, a soil gas survey will be conducted to delineate the areal extent of each plume. This survey consists of driving stainless steel probes through the soil horizon to the base of the unsaturated zone. A sample of soil gas will be extracted into a teflar bag, and the sample screened using an organic vapor analyzer.
2. **Hydropunch Sampling:** Hydropunch sampling will be conducted within the plume areas as delineated by the soil gas survey to characterize the areal and vertical extent of the organochlorine pesticide migration in the groundwater. Hydropunch is a direct push technology which facilitates collection of samples from discrete zones in the aquifer without installation of permanent monitor wells.

Groundwater samples will be collected from select locations and depths, and will be analyzed in the field using a field gas chromatograph. The gas chromatograph will analyze samples for EPA Method 8080 organochlorine pesticides. Up to 14 hydropunch samples will be collected and analyzed.
3. Based on the plume delineation developed through soil gas and hydropunch sampling, locations and depths for permanent monitor wells will be selected. For planning purposes, an estimated five shallow wells, two intermediate depth wells, and one deep well will be installed and sampled. Several existing wells will be resampled to provide an adequate data set for plume delineation. Monitor well samples will be analyzed for EPA Method 8080 organochlorine pesticides, EPA Method 8140 organophosphate pesticides plus malathion and ethion, and for EPA Method 8020 (plus xylenes) volatile organic compounds.

## REFERENCES

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1. United States Environmental Protection Agency, Region IV. Administrative Order of Consent. Chevron Chemical Company Site, Orange County, Florida. May 1990.
2. Bouwer, H., and Rice, R. C., 1964. A Slug Test for Determining Hydraulic Conductivity of Unconfined Aquifers with Completely or Partially Penetrating Wells. Water Resources Research. 12:423-428.
3. Dames and Moore. Confidential Report Survey and Assessment of Former Agricultural Chemical Plant Site, Orlando, Florida. Prepared for Chevron Chemical Company. 1983.
4. Patry, J.J. Memo to file, Site Visit Central Florida Mack Truck, Orlando, Florida. June 1987.
5. Starosciak, N., Troutman, G.B., Uttal, R., Personal Communication. May 30, 1990.
6. Jammal & Associates, Inc., Preliminary Contamination Assessment, Central Florida Mack Truck Company, 3100 Orange Blossom Trail, Orange County, Orlando, Florida. Prepared for Southeastern Investment Properties, Inc. 1987.
7. Doolittle, J.A., and Schelentrager, G. Soil Survey of Orange County, Florida. United States Department of Agriculture, Soil Conservation Service. August 1989.
8. NUS Corporation. Analytical Results for Soil and Groundwater Samples from the NUS Screening Site Inspection, Phase II. 1989.
9. Schiner, George R., and German, Edward R. Effects of Recharge from Drainage Wells on Quality of Water in the Floridan Aquifer in the Orlando Area, Central Florida. U.S. Geological Survey Water Resources Investigations Report 82-4094. 1983.
10. United States Environmental Protection Agency. Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual. EPA/540/1-89/002. December 1989. Interim Final.
11. White, W. A., The Geomorphology of the Florida Peninsula, State of Florida Department of Natural Resources, Bureau of Geology, Bulletin No. 51. 1970.

**APPENDIX A**

***SOIL BORING AND WELL COMPLETION LOGS***

## APPENDIX A

### ~~SOIL BORING AND WELL COMPLETION LOGS~~

---

Lithologic logs were made as each well was being drilled. Split spoon sampling on 5-foot centers was performed in order to describe the formation encountered at the site. The 33-foot deep wells were continuously sampled for a more detailed description of the lithologic at the site.

A well completion log was completed as each well was drilled in order to graphically depict the construction of the well.

Soil boring logs were maintained for each boring drilled at the site.

## **WELL CONSTRUCTION LOG**

PROJ. 545

**WEL** *M* - 5

## **METHODS**

**DATE:** 01-12-00

**LOGGER:** *Yea Meister*

## **WELL CONSTRUCTION LOG**

PRO 5456

WELL D

**METHOD:** Hohen Stein Paper Strip Spoon

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
3'	- Dk brn top soil, silty sand - slightly wet.	-
5'	- 9in sand, dkbrn, sime blk - f-mgr, silt - 15in sand, brn, f-mgr, silt	- 5' >6, 2, 3, 4 - 7'
10'	- 6in - sand, skbrn -blk, vt-fgr, sime silt	- 10' > 2, 3, 2, 3
12'	- 3in. - sand, ltbrn, f-mgr.	- 12'
15'	- 15in - sand, skbrn, vtgr, sime silt	- 15'>5, 7, 7, 8
17'	- 6in - sand, skbrn, vtgr, sime silt - 18in - sand gr-tan, some wn, vt-fgr, & silt.	- 17'

**DATE:** 9-11-90

**LOGGER:** *Y* *36-200-2764-22*

2 2 0292

## **WELL CONSTRUCTION LOG**

**PRC** 5456

WEI E

## **METHOD:** Hollow Stem Power, Fall Season

**DATE:** 4-12-90

**LOGGER:** *Lia in room*

## WELL CONSTRUCTION LOG

2 2 0293

PROJ:

5456

WELL:

F

METHOD:

Continuous Flight Auger

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
-	Block fill and chunks of concrete	-
3'	sand, dk, silty	-
5'	sand, dk brn - reddish brn, far, tr silt	-
6.5'	-	-
10'	sand, dk brn, v fgr	-
12'	sand, wh - tgy, vt-fgr clay, gy, v fgr sand, tr	-
15'	sand, brngy, vt-fgr <sup>silt</sup>	-
18'	sand, brn, silty, tr clay	-
20.5'	sand, brn, some clay	-
-	sand, tan & fgr, some clay	-
23'	sand, wh, f-mgr	-
25'	sand, tan f-mgr	-
26'	clay, grey, sandy	-
28'	sand, wh, tan, clayey	-
30'	sand, gy, f-mgr, some clay, iron oxide stain	-
32.5'	clay, med gr, very plastic	-
-	-	-
-	-	-
-	-	-

DATE:

9-12 90

LOGGER:

J. Morris

WELL CONSTRUCTION LOGPROJ. # 5456WELL # GMETHOD: Continuous Flight Corer

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
-	Sand, dk brn, silty	-
-	-	-
3'	sand, brn, v-far, sme silt	-
5'	sand, dk brn - dk. silty	-
6'	silt, dk gybrn, sme sand	-
9'	fr gy clay	-
11.5'	WET	-
-	sand, brn, far, sme silt	-
-	sand, gybrn, v-far, sme silt, fr clay	-
15'	sand, gybrn, f-mgr, silty, fr clay	-
18'	-	-
20'	as above, v-far	-
22'	sand, dk gybrn, f-mgr	-
25'	sand, tan, f-mgr	-
-	as above	-
-	as above	-
28.5	clay, med gy, fr non calcareous	-
-	-	-
-	-	-
-	-	-

DATE: 6-13-96LOGGER: J. McNamee

2 2 0295

## **WELL CONSTRUCTION LOG**

~~PRO~~ 5450

WEBSITE: [www.english-test.net](http://www.english-test.net)

**METHOD:** *HSH*

**DATE:**

**LOGGER:** \_\_\_\_\_

2 2 0296

## **WELL CONSTRUCTION LOG**

PRO 5456

**WEL**

**METHOD:** Longitudinal study design

**DATE:** 6-11-07

**LOGGER:** Tom Mepham

2 2 0297

## **WELL CONSTRUCTION LOG**

PRC

5456

W

1

ME

二

DATE:

**LOGGER:**

**WELL CONSTRUCTION LOG**

2 2 0298

**PROJECT:**S456**WELL**K**METHOD:**Continuous Flunt - up

DEPTH (FT)	FORMATION DESCRIPTION	WELL CONSTRUCTION
-	Dk brn TAN Silt	-
-	-	-
3'	Sand, lt brn, silt	-
-	-	-
5'	Sand, brn-dk brn F-mor, silty	-
-	-	-
8'	Sand, dk reddish brown silt	-
-	-	-
10'	Sand, dk brn, SKYDORN silt, silty	-
-	-	-
11'	Sand, gr., + silt	-
-	-	-
-	Sand, ay brn, silt, + clay	-
-	-	-
15'	Sand, lt brn, some mclay, vt-fgr, some silt, + clay	-
-	-	-
18'	AS ABOVE - 2nd mor	-
-	-	-
20'	SAND - THIN mar, some fgr	-
-	-	-
22'	SAND - THIN, -in mar	-
-	-	-
25'	SAND THIN F-mor	-
-	-	-
-	-	-
30'	TAN SAND	-
-	-	-
-	-	-
33.5'	CLAY, MGY, REDISH OXIDE STAIN	-
-	-	-
-	-	-

**DATE:**9-13-90**LOGGER:**J. D. Wilson

2 2 0299

## **WELL CONSTRUCTION LOG**

**PROJECT:** 5456

**WELL** L

**METHOD:** Hollow Stem Auger

**DATE:** \_\_\_\_\_

**LOGGER:** \_\_\_\_\_

## **WELL CONSTRUCTION LOG**

2 2 0300

**PROJECT:**

545

**WELL**

1

#### METHOD:

## Hottentot Fig or Acanthus

DATE:

9-11 9(2)

**LOGGER:**

20 minutes

## WELL CONSTRUCTION LOG

2 2 0301

**PROJECT:** 5456

**WELL**    **N**

**METHOD:** Follow STEM Order. Split Specim

**DATE:** 4-10-40

**LOGGER:** Mike McLean

## **WELL CONSTRUCTION LOG**

2 2 0302

**PROJECT:** 5456

WELL C

**METHOD:** Hollow Stem Inner w/ Saw

**DATE:** 4-12-40

**LOGGER:** *Lamnia*

## **WELL CONSTRUCTION LOG**

2 2 0303

**PROJECT:** 5456

**WELL** ~~ONE~~ P

## **METHOD:** Hollow Stem Tower Split Test

**DATE:** 11/11/10

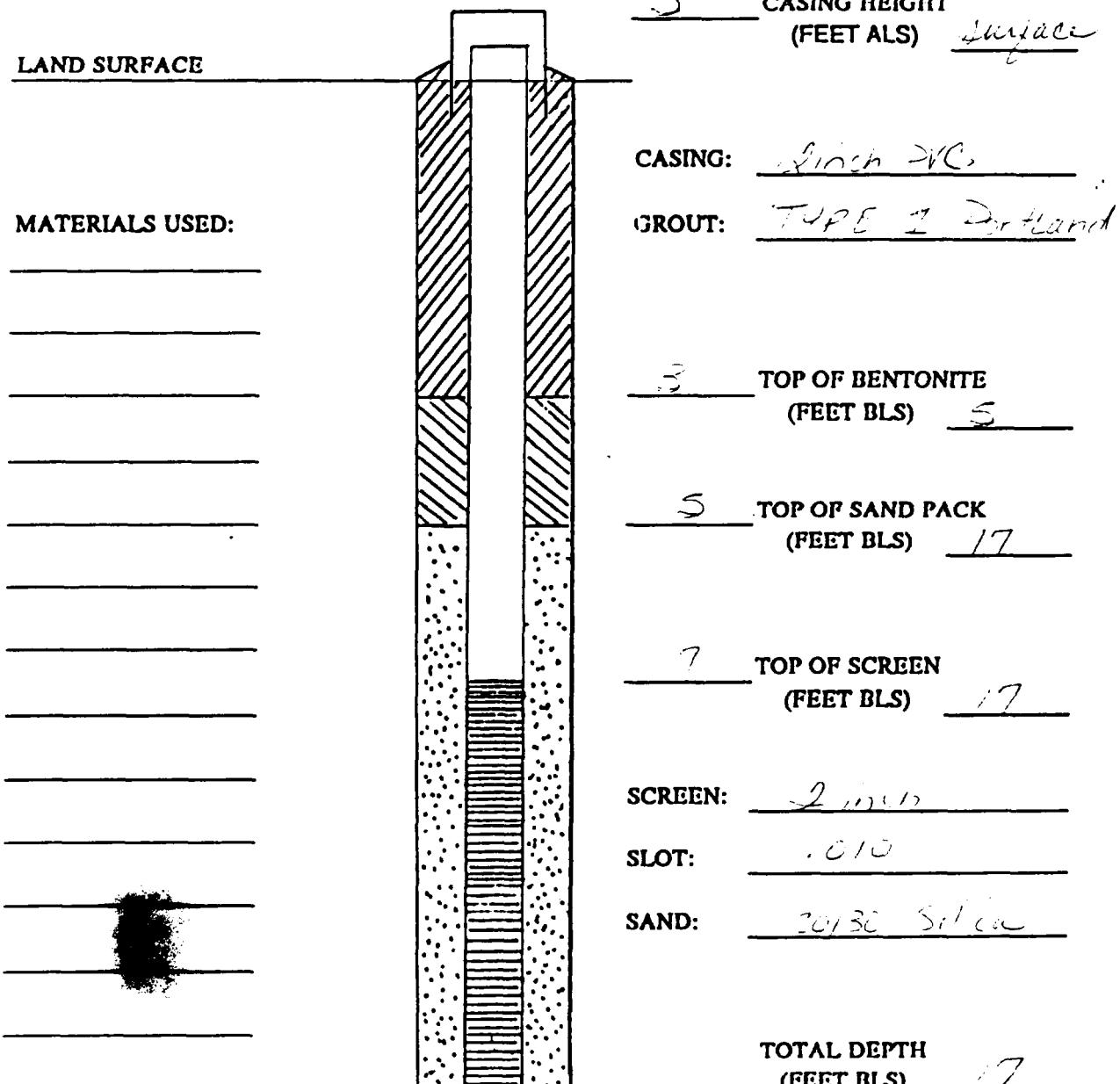
**LOGGER:** *→ 24 hours*

## WELL COMPLETION LOG

2 2 0304

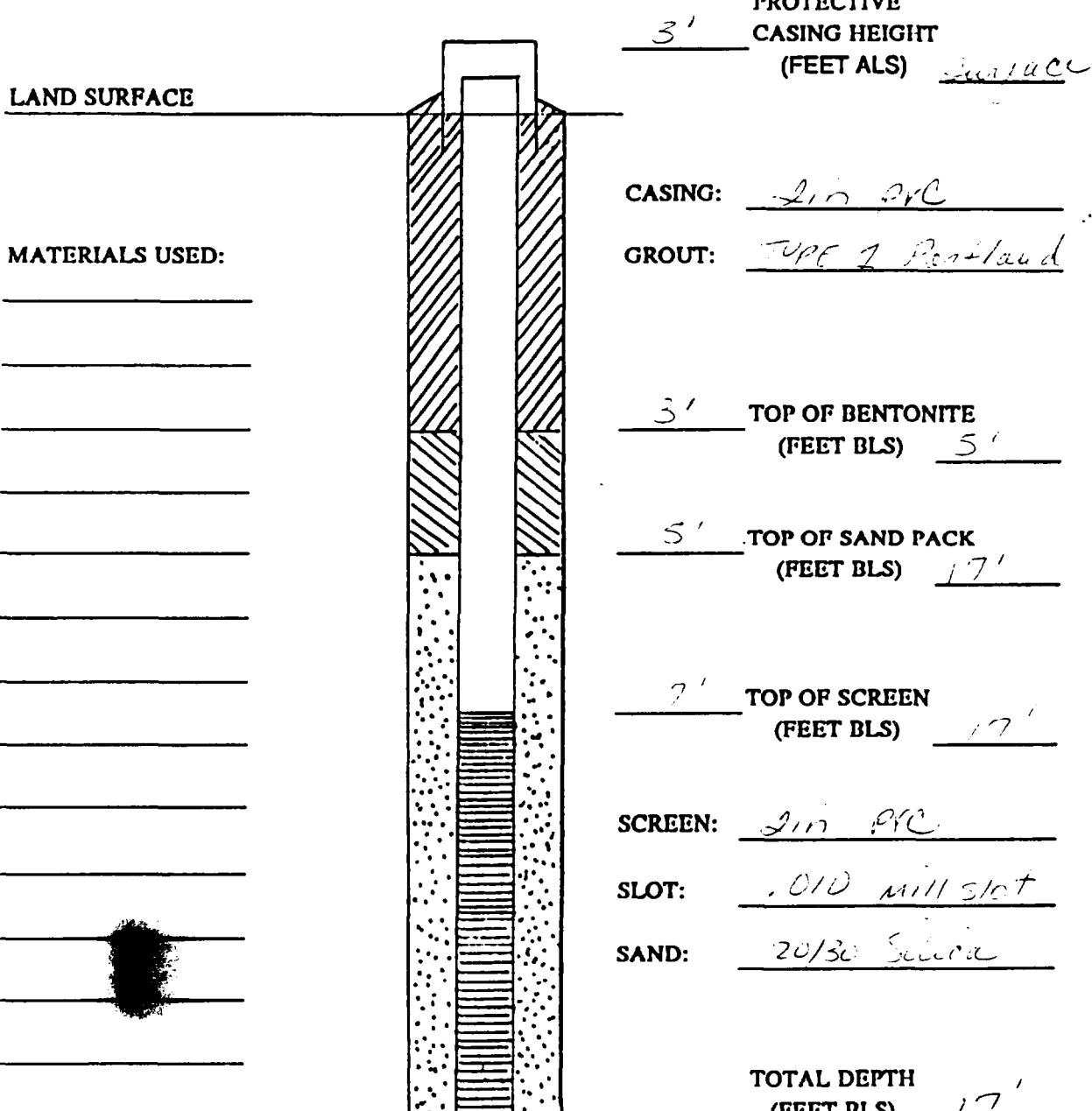
PROJECT: 5456

WELL NUMBER: A

DRILLING METHOD: Hollow Stem AugerLAND SURFACECOMPLETION DATE: 4-10-90LOGGED BY: Jim Morrison

2 2 0305

## WELL COMPLETION LOG

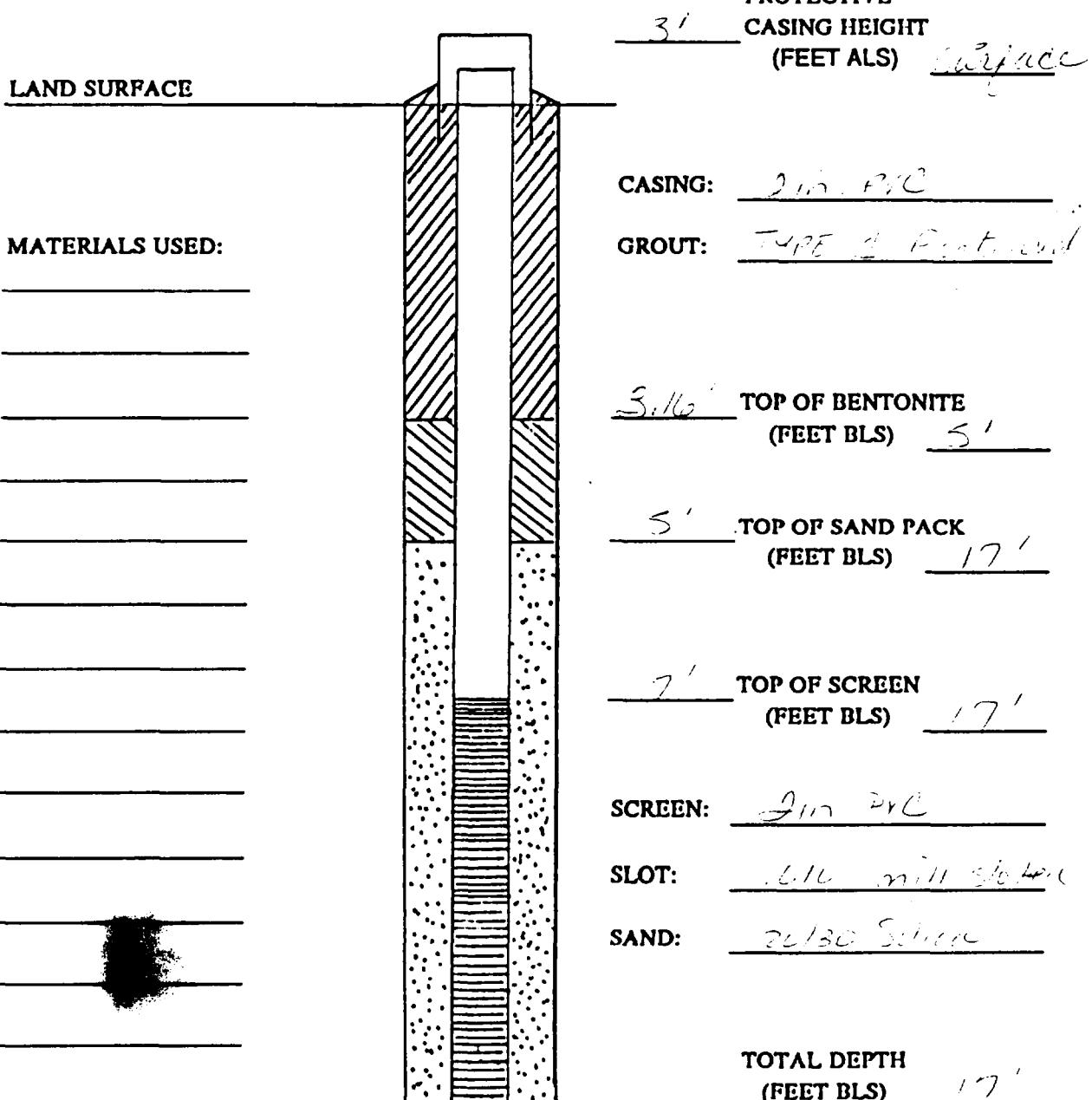
PROJECT: 5456WELL NUMBER: 2DRILLING METHOD: Hollow stem screenCOMPLETION DATE: 9-11-90LOGGED BY: Vin Mervin

## WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: E

DRILLING METHOD: Hollow stem auger



COMPLETION DATE: 9-12-90

LOGGED BY: Tom Mullin

2 2 0307

## WELL COMPLETION LOG

PROJECT:

5456

WELL NUMBER:

F

DRILLING METHOD: Perforated flight auger

LAND SURFACE

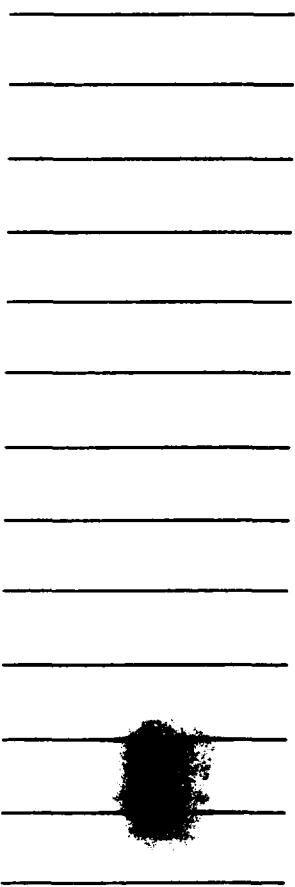
PROTECTIVE  
CASING HEIGHT

(FEET ALS)

surface

3'

MATERIALS USED:

CASING: 2in PVCGROUT: TYPE 1 Portland15' TOP OF BENTONITE  
(FEET BLS) 17.5'17.5' TOP OF SAND PACK  
(FEET BLS) 32'22' TOP OF SCREEN  
(FEET BLS) 32'SCREEN: 2in PVCSLOT: .010SAND: 20/30 silicaTOTAL DEPTH  
(FEET BLS) 32'COMPLETION DATE: 9-12-90LOGGED BY: Vicki Morrison

## WELL COMPLETION LOG

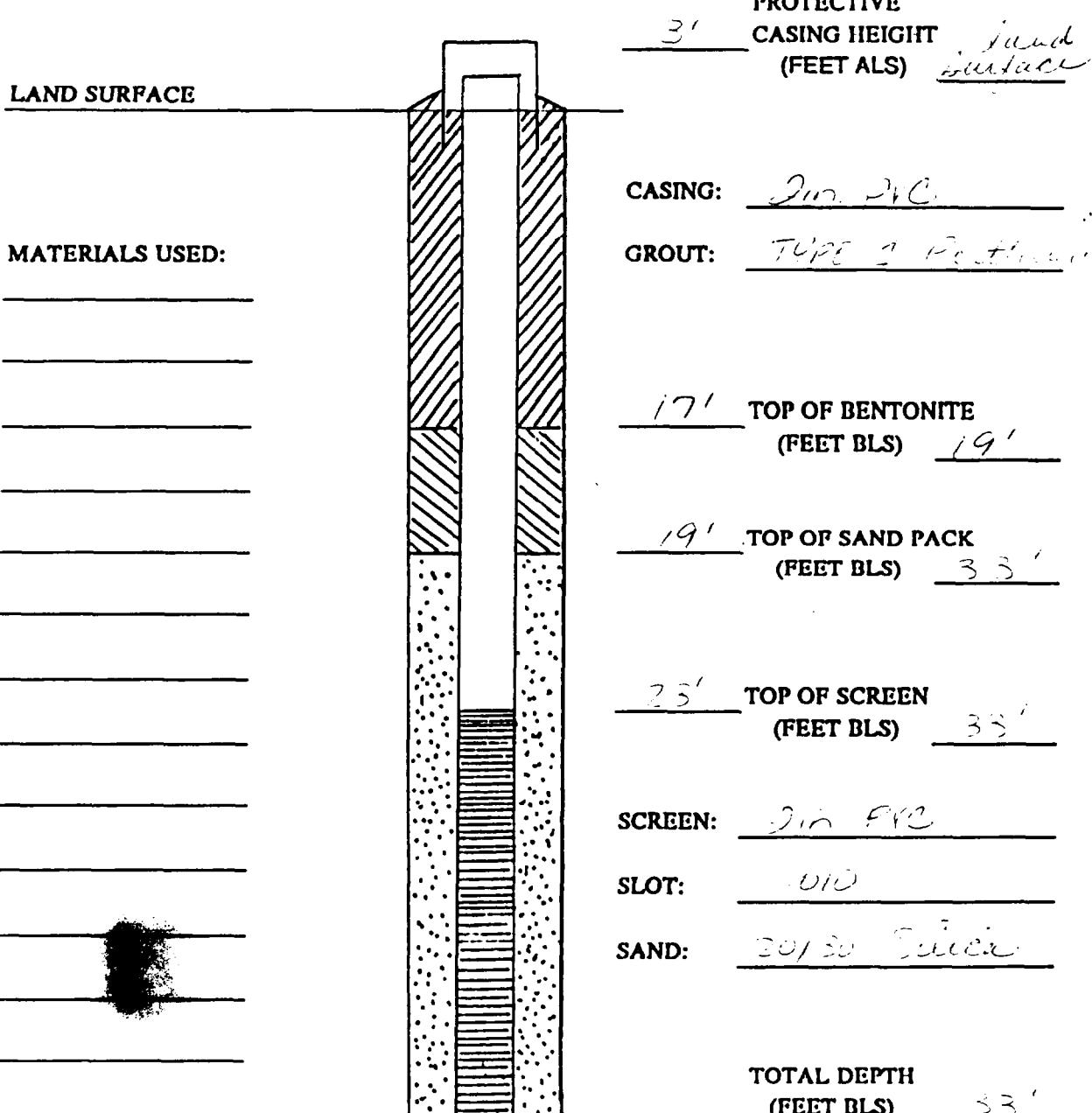
2 2 0308

PROJECT:

5456

WELL NUMBER:

5

DRILLING METHOD: Continuous Flight Auger

COMPLETION DATE:

9-13-90

LOGGED BY:

Lisa Johnson

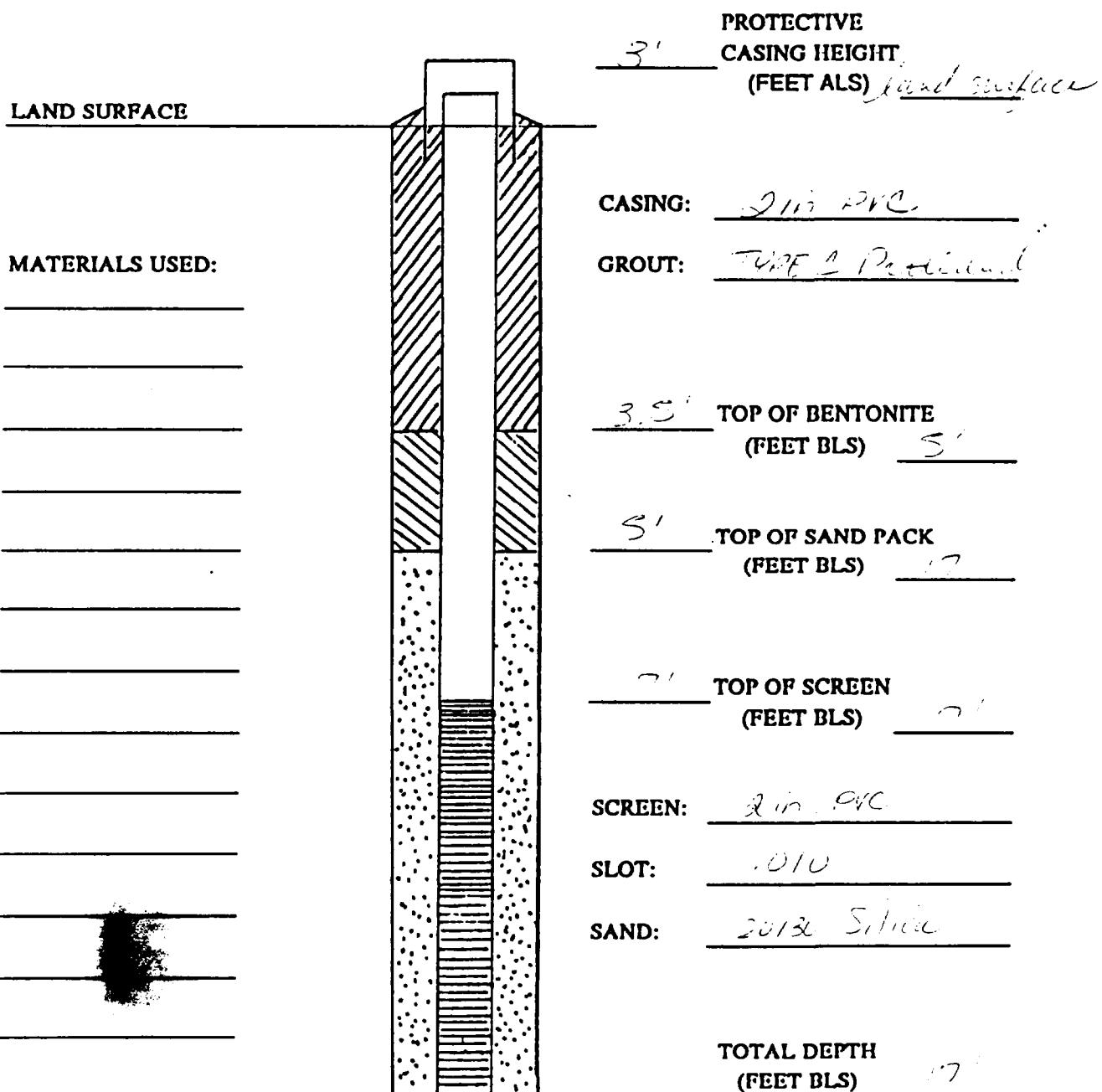
2 2 0309

## WELL COMPLETION LOG

PROJECT: 5456

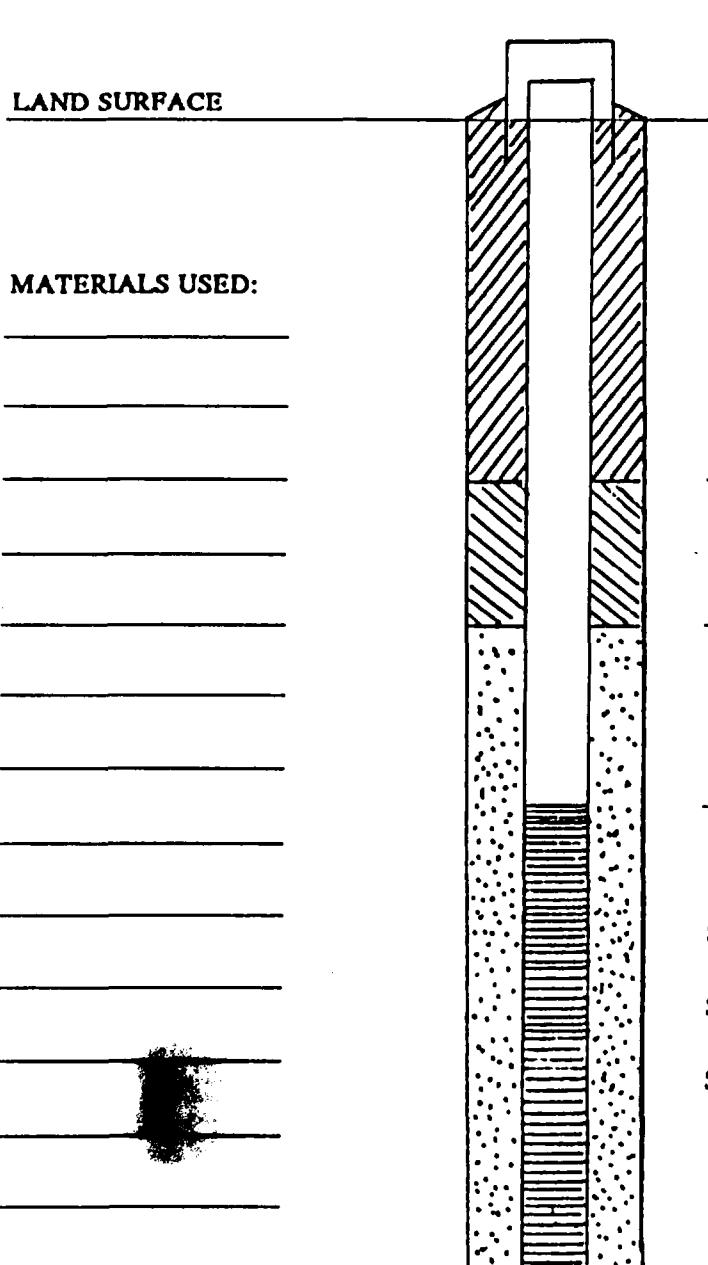
WELL NUMBER: 4

DRILLING METHOD: vertical stem trigger



COMPLETION DATE: 01-13-90

LOGGED BY: Jim Morrison

WELL COMPLETION LOGPROJECT: 5456WELL NUMBER: IDRILLING METHOD: Vertical stem augerPROTECTIVE  
CASING HEIGHT  
(FEET ALS) 3' land surfaceCASING: 2in PVCGROUT: TYPE 1 - Portland3.5' TOP OF BENTONITE  
(FEET BLS) 5'5' TOP OF SAND PACK  
(FEET BLS) 17'7' TOP OF SCREEN  
(FEET BLS) 17'SCREEN: 2in PVCSLOT: .10"SAND: 20# riceTOTAL DEPTH  
(FEET BLS) 17'COMPLETION DATE: 9-11-90LOGGED BY: Vern Johnson

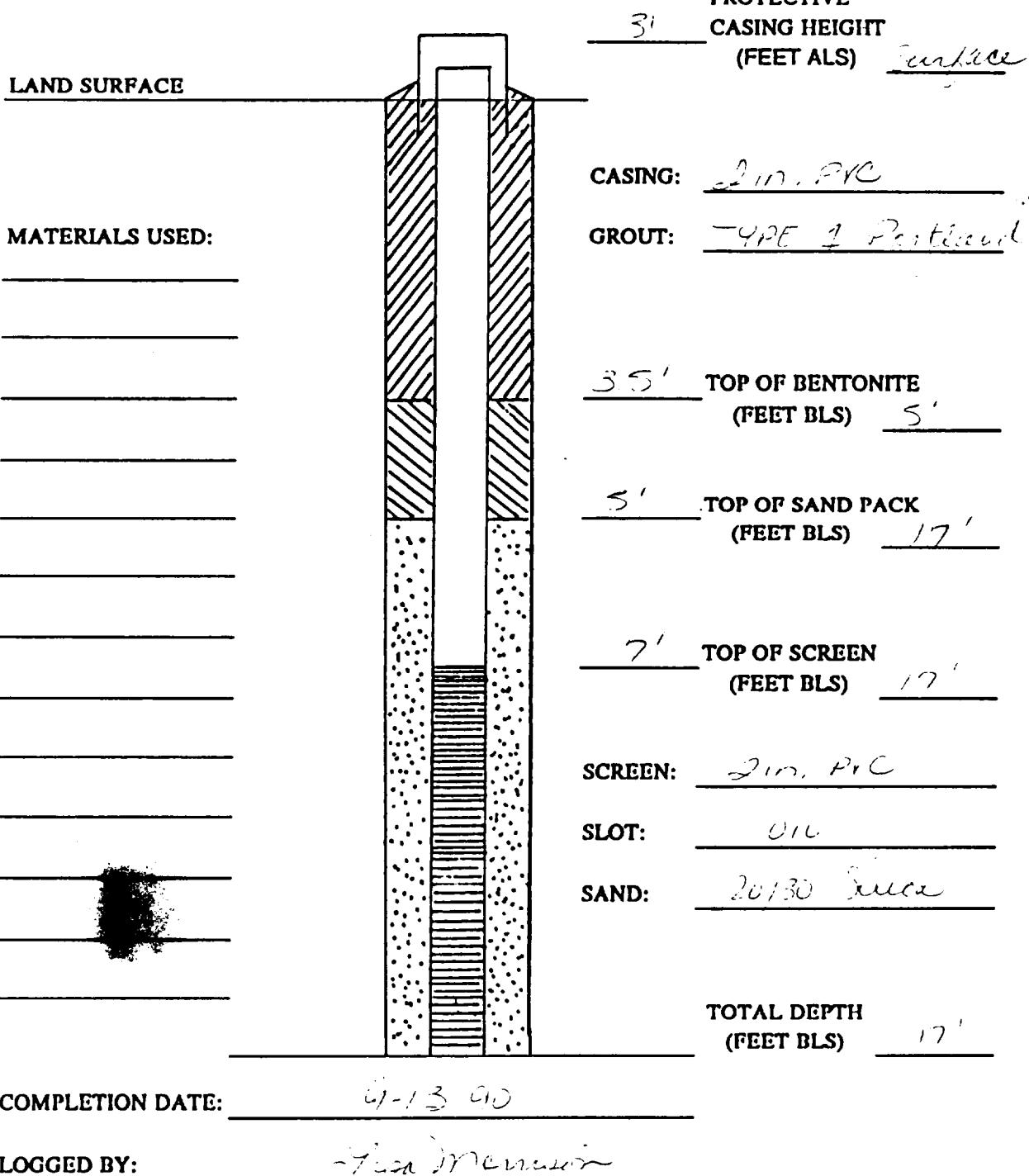
## WELL COMPLETION LOG

2 2 0311

PROJECT: 5456

WELL NUMBER: 5

DRILLING METHOD: Hollow stem Auger



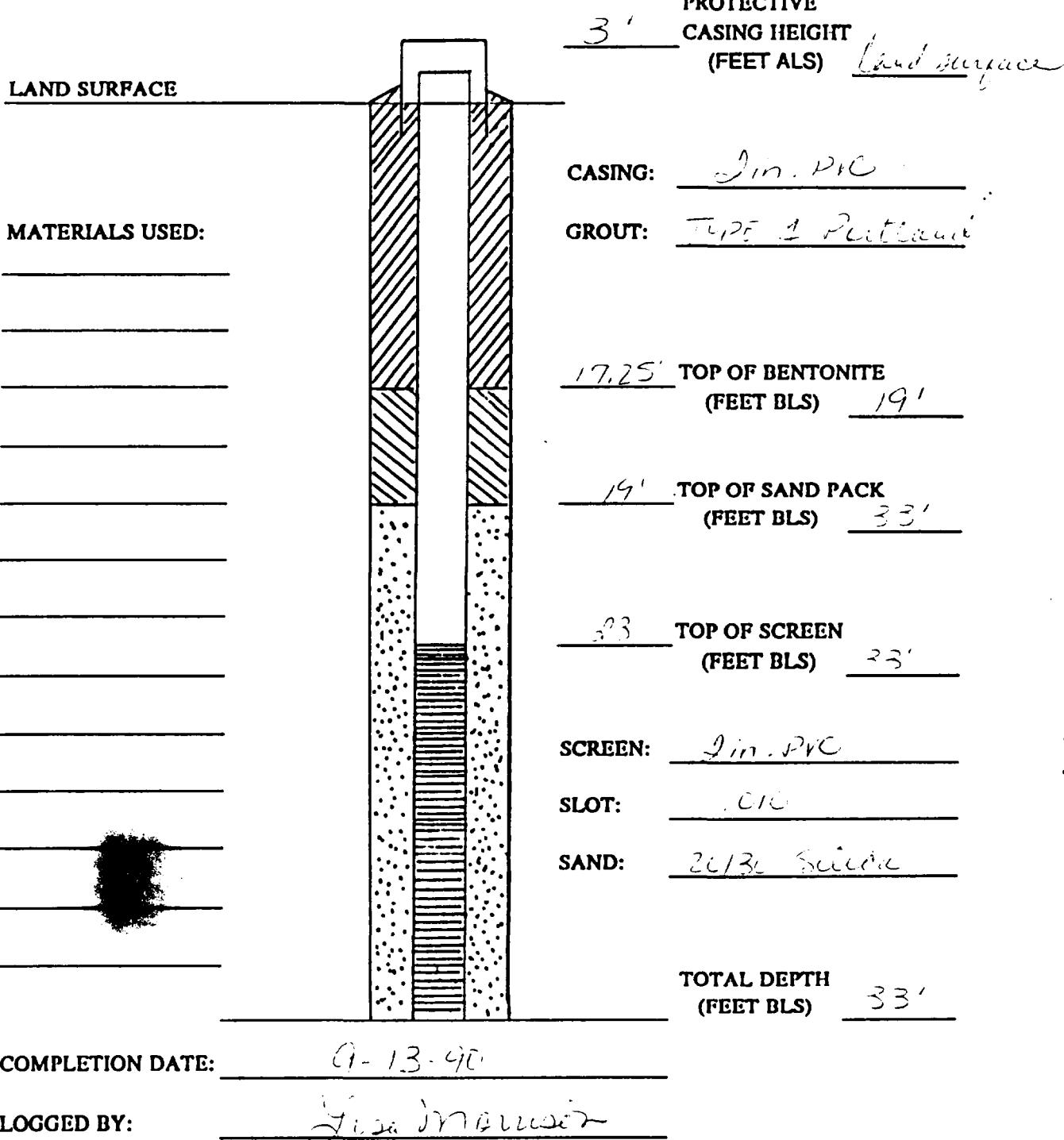
## WELL COMPLETION LOG

2 2 0312

PROJECT: 5456

WELL NUMBER: K

DRILLING METHOD: Continuous Flight Auger



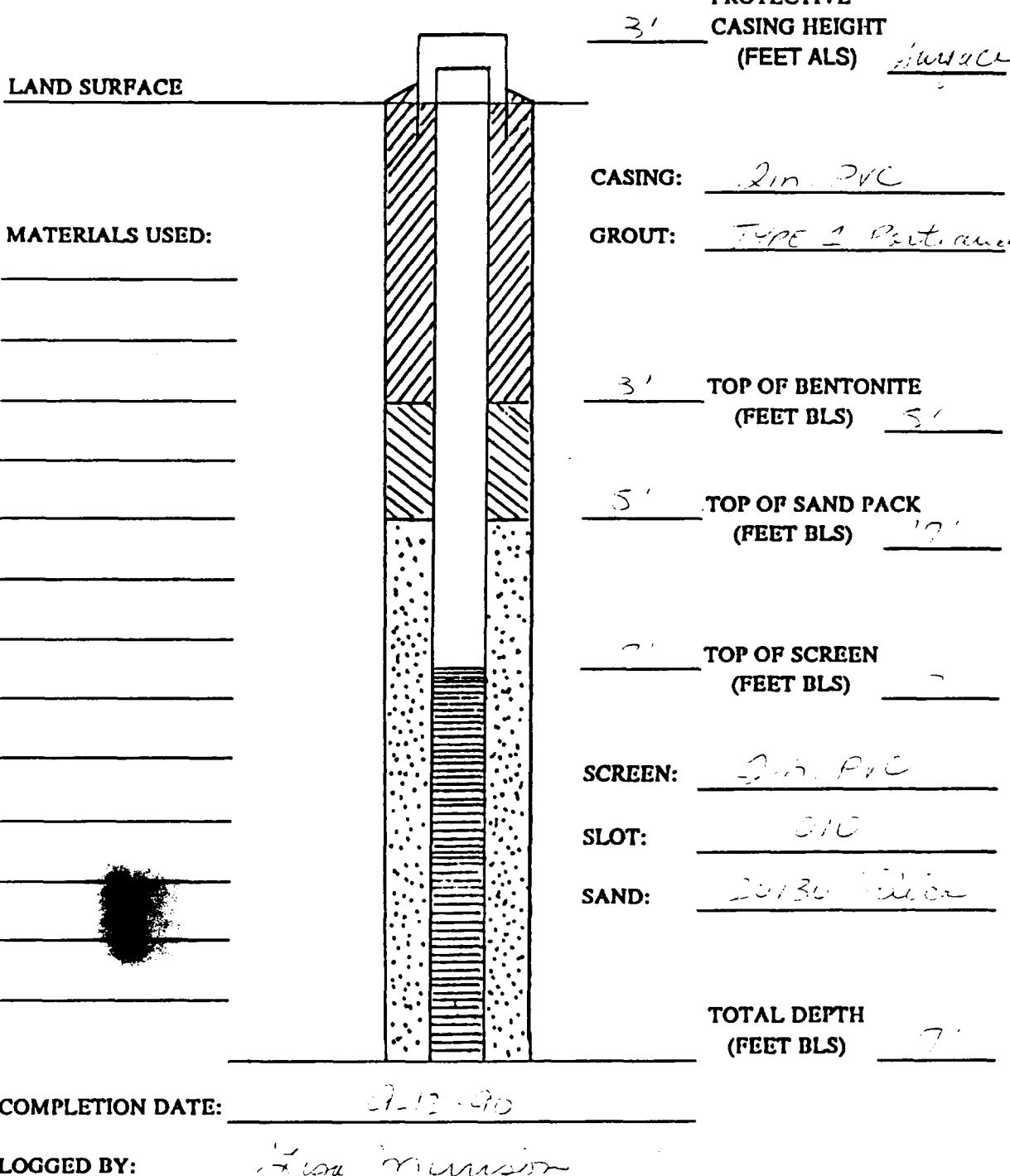
2 2 0313

## WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER L

DRILLING METHOD: Continuous flight auger



2 2 0314 .

## **WELL COMPLETION LOG**

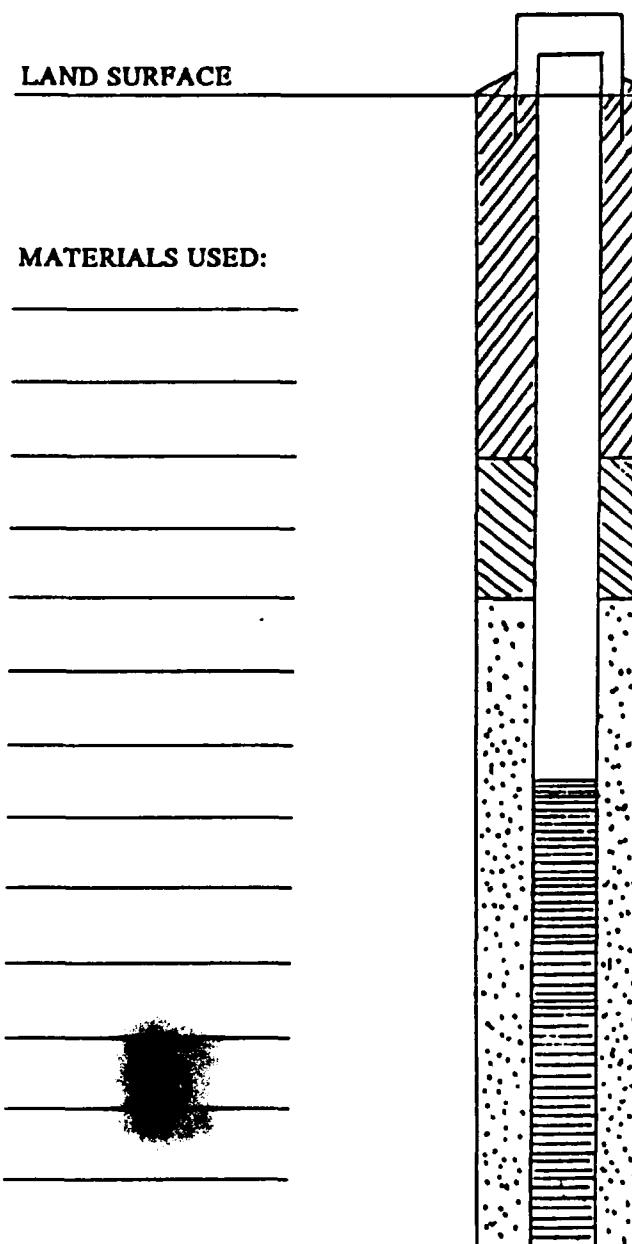
**PROJECT:** 5456

**WELL NUMBER:** 11

**DRILLING METHOD:** Stein Stem Auger

## LAND SURFACE

## MATERIALS USED:



**PROTECTIVE  
CASING HEIGHT  
(FEET ALS) Surface**

CASING: 2 7/8"

**GROUT:** Type I Portland

3.5' TOP OF BENTONITE  
(FEET BLS) 5

5      **TOP OF SAND PACK  
(FEET BLS)**      22

12 **TOP OF SCREEN**  
**(FEET BLS)** 22

**SCREEN:** -210 - PVC

**SLOT:** 670

**SLOT:** • CTC

**SLOT:** • CTC

**SAND:** 20/30 screen

**SAND:** 20/30 screen

**TOTAL DEPTH**  
**(FEET BLS)** 22'

**COMPLETION DATE:** 6-11-90

**LOGGED BY:** Tom Maringer

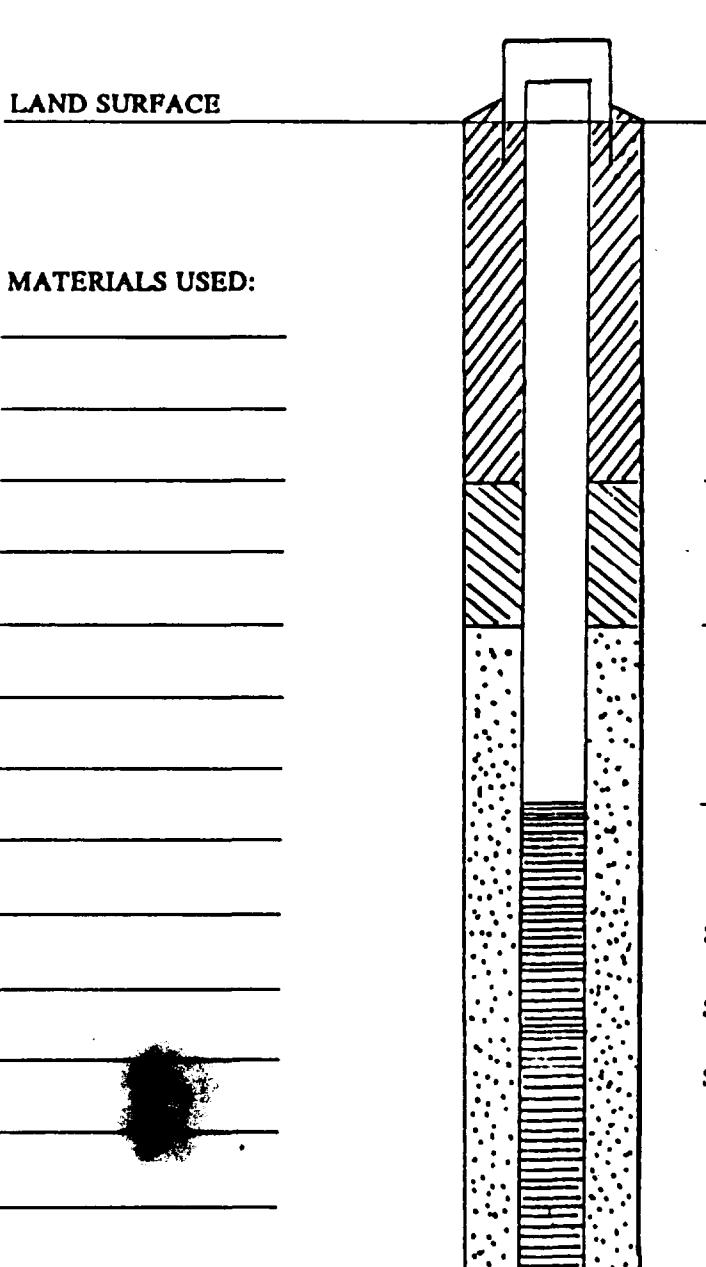
220315

## WELL COMPLETION LOG

PROJECT: 5456

WELL NUMBER: N

DRILLING METHOD: slow tim. auger

PROTECTIVE  
CASING HEIGHT  
(FEET ALS)

3'

surface

CASING: 2 in PVC

GROUT: TYPE I Portland

TOP OF BENTONITE

(FEET BLs)

5'

TOP OF SAND PACK

(FEET BLs)

17'

TOP OF SCREEN

(FEET BLs)

17'

SCREEN: 2 in. PVC

SLOT: .010

SAND: 20/30 silica

TOTAL DEPTH

(FEET BLs)

17'

COMPLETION DATE: 6-10 90

LOGGED BY: Jim Munson

2 2 0316

## **WELL COMPLETION LOG**

**PROJECT:** 5456

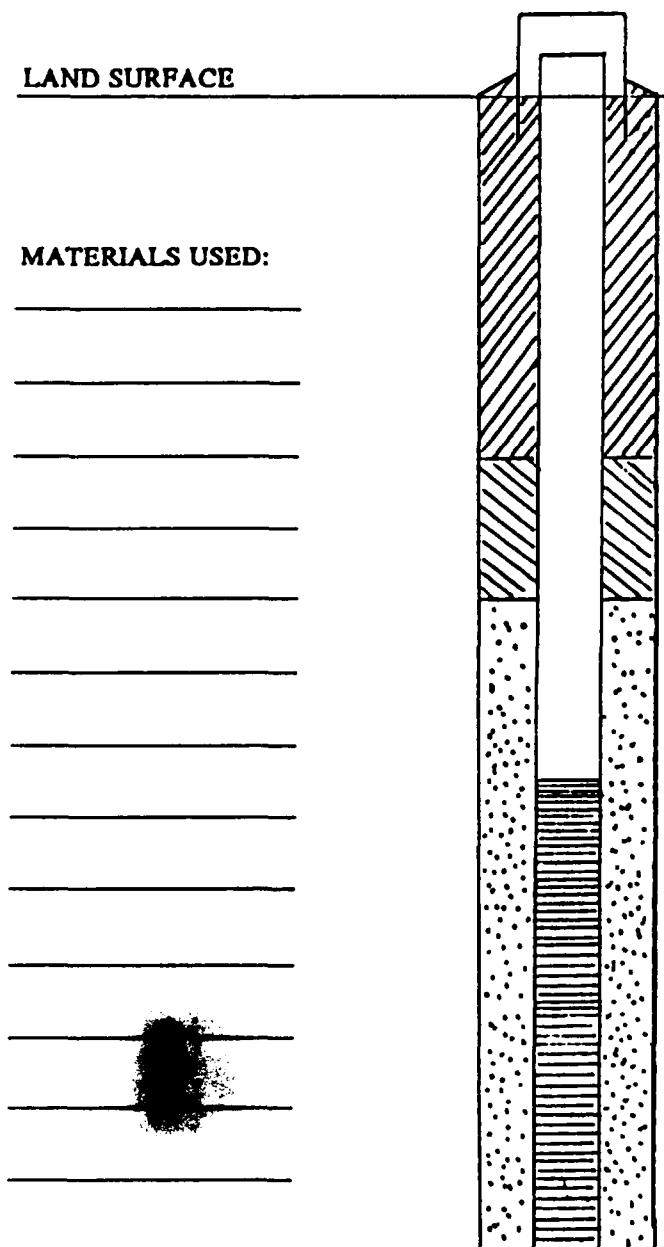
**WELL NUMBER** C

**DRILLING METHOD:** Hollow stem auger

## LAND SURFACE

## **MATERIALS USED:**

---



**PROTECTIVE  
CASING HEIGHT  
(FEET ALS)**

## Surface

**CASING:** 2in PVC

**GROUT:** Type I Mortar

3' TOP OF BENTONITE  
(FEET BLS) 3'

S' TOP OF SAND PACK  
(FEET BLS) 12'

TOP OF SCREEN  
(FEET BLS)

**SCREEN:** 2 in. x 2 in.

**SLOT:** 010

**SAND:** 2013-04-06

**TOTAL DEPTH**  
**(FEET BLS)** 17'

**COMPLETION DATE:** 6-12-90

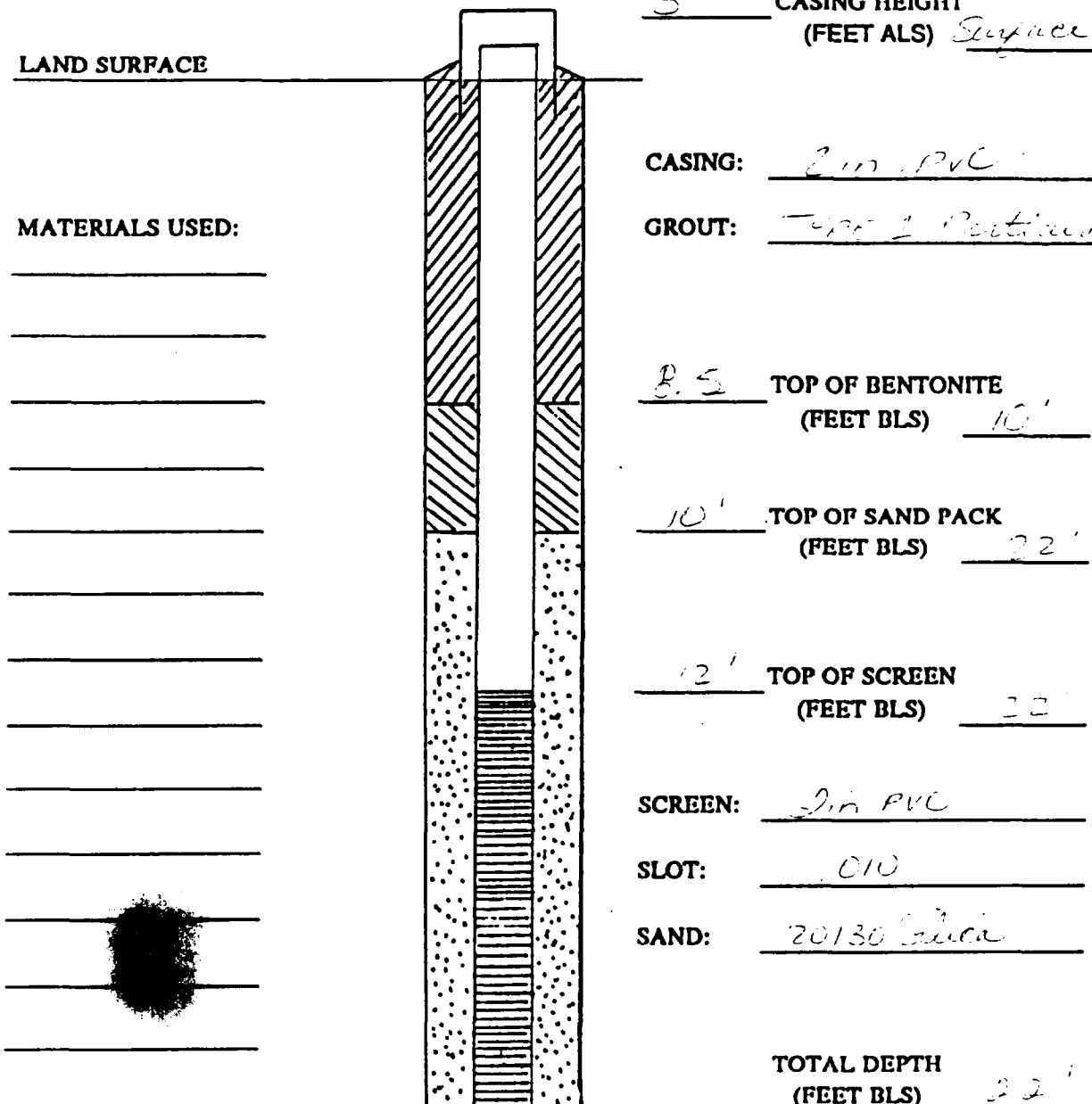
**LOGGED BY:** Tom Morrison

## WELL COMPLETION LOG

2 2 0317

PROJECT: 5456

WELL NUMBER: D

DRILLING METHOD: Shallow Stem DrilledLAND SURFACE

COMPLETION DATE: 07-11-90

LOGGED BY: John M. Moore

2 2 0318

SOIL BORING CONSTRUCTION LOGPROJECT: 5456DATE: 10-10-90CODE: T-1TIME: 0830METHOD: Continuous Split Spoon LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-8"	white limy fill		
8"-2'	snd, dkgy, vfg, wrnd, wst		
2'-2.5'	snd - lgy, vfg		
2.5-4'	snd - wh. vfg		
4'-5'	AS ABOVE		
5'-6'	snd, blk, vfg		wet
6-8'	snd, dkbrn-blk, silt		wet 1 foot of recovery
8'-10'	snd, dkbrn, vfg, some silt		saturated

22 0319

## SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90  
 CODE: T-2 TIME: 1000  
 METHOD: Spt LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0'-9"	white lime fill		
9"-2'	snd, dkgybrn, vf		
2'-4'	snd, wh-tan, vfg, wsr <sup>t</sup>		
4'-5'	AS above		
5'-6'	snd, dkbrn, fgr, wsr <sup>t</sup> mw rnd		damp
6'-8'	snd, dkbrn, vfg		1 ft recovery Saturated
8'-10'	snd, dkbrn, vfg, tr clay		1 ft recovery

## SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90  
 CODE: T-3 TIME: 1025  
 METHOD: SPT LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0'-1'	white lime fill		
1'-2'	snd, dkgy, vfg		
2'-3'	as above		
3'-4'	snd, wh, vfg, alternating w/ 3 in layers of brn sand		
4'-5'	as above		
5'-6'	snd, vdkbrn, vfg		wet
6'-8'	snd, vdkbrn, vfg, trslit		wet
8'-10'	snd - vdkbrn, brn - lbrn vfg.		saturated

22 0321

## SOIL BORING CONSTRUCTION LOG

PROJECT: 3456

DATE: 10-10-90

CODE: T-4

TIME: 10:45

METHOD: SPT

LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-2'	fill - 6 in 18 in sand, silt, v fgr		
2-2.5'	as above		
2.5-4'	sand, silt, 1tay, v fgr, w srt		
4'-5'	as above		
5-6'	sand, vdkbrn, v fgr, stone plant material		WET
6'-7'	sand, OK brn, v fgr		wet
7'-8'	sand, vdkbrn, v fgr, sity		very hard layer
8'-10'	sand, vdkbrn, sity		

2 2 0322

## SOIL BORING CONSTRUCTION LOG

PROJECT: 5456 DATE: 10-10-90  
 CODE: T-5 TIME: 1130  
 METHOD: SPT LOGGER: L. Morrison

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0-6"	fill		
6"-2'	snd, dk brn, f-mgr, wnd, wsrt		
2'-4'	snd, wh, fgr		
4'-5'	snd, white, v f fy, wnd, wsrt		
5'-6'	snd, dk brn - bK, v f gr.		wet
6-8'	snd, bK, fgr, silty		
8'-10'	snd, dk brn - bK, fgr silty.		Saturated

## SOIL BORING CONSTRUCTION LOG

2 2 0323

PROJECT: 5456 DATE: 10/10/90  
 CODE: T-6 TIME: 1200  
 METHOD: SPT LOGGER: L. MORRISON

DEPTH INTERVAL	FORMATION DESCRIPTION	BLOWS PER 6 IN.	COMMENTS
0'-4"	organic silt fill		
4"-2'	snd, dk brn		
2'-4'	snd, wh, fgr		
4'-4.6"	fill		
4.6"-5.6'	snd, wh, fgr		
5.6"-6'	snd, brn, fgr		
6'-8'	snd, wh-brn, 1 ft silt silty snd.		
8'-10'	snd, dk brn - silt, silty		wet

**GROUNDWATER PROTECTION, INC.**  
**LOG OF BORING**

2 2 0324

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	3100 HWY 441	DREW CREW	RAYMOND & DAVE
	ORLANDO, FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #17
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE  
STATIC WATER LEVEL 5'

**GROUNDWATER PROTECTION, INC.**  
**LOG OF BORING**

220325

**SITE NAME CHEVRON CHEMICAL**

## DRILLER

VANCE BIEHL

**LOCATION 310~~0~~ HWY 441**

DREW CREW

**RAYMOND & DAVE**

ORLANDO, FL.

BORING DATE 10/09/90

**CLIENT** BROWN & CALDWELL CONSULTANTS

**BORING #**      **SB #23**

PROJECT # 5287

**WORKORDER # 2418**

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

**STATIC WATER LEVEL**      **5'**

**GROUNDWATER PROTECTION, INC.**  
**LOG OF BORING**

2 2 0326

SITE NAME CHEVRON CHEMICAL

DRILLER

VANCE BIEHL

**LOCATION 3100 E HWY 441**

DREW CREW

**RAYMOND & DAVE**

ORLANDO, FL.

BORING DATE 10/09/90

CLIENT BROWN & CALDWELL, CONSULTANTS

BORING # SB #27

PROJECT# 5287

WORKORDER # 2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

**STATIC WATER LEVEL**

**GROUNDWATER PROTECTION, INC.**  
**LOG OF BORING**

2 2 0327

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	31 <del>00</del> HWY 441	DREW CREW	RAYMOND & DAVE
	OR <del>00</del> , FL.	BORING DATE	10/09/90
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #29
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE  
STATIC WATER LEVEL 5'

**GROUNDWATER PROTECTION, INC.**  
**LOG OF BORING**

2 2 0328

SITE NAME	CHEVRON CHEMICAL	DRILLER	VANCE BIEHL
LOCATION	300 N HWY 441 ORLANDO, FL.	DREW CREW	RAYMOND & DAVE
CLIENT	BROWN & CALDWELL CONSULTANTS	BORING #	SB #35
PROJECT#	5287	WORKORDER #	2418

METHOD: HAMMER ADV. X THRU AUGER X ROTARY SPLIT SPOON X SHELBY TUBE

## **STATIC WATER LEVEL**

**APPENDIX B**

***GROUND PENETRATING RADAR SURVEY REPORT***

2 2 0330

**DETECTION SCIENCES, INC.**

EASTERN DIVISION

496 HEALD ROAD

CARLISLE, MASSACHUSETTS 01741

(508) 369-7999

TELEX: 495-2806

FAX: (508) 264-9934

**FINAL REPORT**

**GROUND-PENETRATING  
RADAR SURVEY**

**CHEVRON ORLANDO  
ORLANDO, FLORIDA**

Prepared for:

**BROWN & CALDWELL, INC.  
201 East Pine Street      Suite 1416  
Orlando, Florida 32801**

November 15, 1990

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## INTRODUCTION AND SUMMARY

On September 5-7, 1990, Detection Sciences, Inc. performed a ground-penetrating radar (GPR) survey at the Chevron Orlando Facility, Orlando, Florida. The purpose of the ground-penetrating radar survey was to identify and delineate soil which may have become contaminated from the operation of a former industrial facility on this property. The survey was conducted according to the requirements of Brown & Caldwell Consulting Engineers under the field direction of Mr. Russell V. Bowen, P.E. of Brown & Caldwell, with the assistance of Ms. Lisa Morrison of Brown & Caldwell.

The survey found both ionic and non-ionic radar anomalies in the soil. We presume that these radar anomalies are caused by chemical contamination. The exact cause of the radar signatures — i.e., the types of chemicals and the concentrations of these chemicals — must be determined by laboratory analysis of soil samples.

There are four main advantages for using ground-penetrating radar (GPR) for this type of survey:

- Ionic vs. Non-Ionic. The radar is capable of distinguishing between ionic and non-ionic chemicals such as acids and salts versus pesticides and petroleum products.
- Improved Detection Threshold. Detection Sciences has made proprietary design modifications to our radar equipment which has greatly improved the sensitivity of this equipment. Previously, the detection threshold was a concentration level in the low parts per million (ppm) range. Recent data suggests the detection threshold of our modified radar system may now be in the parts-per-billion (ppb) range.
- Lateral Definition Accuracy. The locations of the boundaries defining the contaminated areas are accurate to within 1 foot, thereby providing a precise determination as to the aerial extent of the modified physical properties in the soil.
- Vertical Definition Accuracy. The vertical distribution, or depth, of the contaminated areas are accurate to within a few inches, thereby providing a precise determination as to the vertical extent of the modified physical properties in the soil.
- Characterization. The radar is capable of characterizing soil conditions caused by the presence of specific chemicals. Used in conjunction with laboratory testing, the radar data can be "calibrated" to precisely determine the lateral and vertical extent of a specific type of contamination.

The results of the survey are shown on Detection Sciences, Inc. Drawing #291-90-01, titled "RADAR SURVEY MAP, CHEVRON ORLANDO SITE, ORLANDO, FLORIDA", which shows the distribution of modified soil characteristics classified as *ionic* or *non-ionic* with gradations within each classification. At certain locations the radar showed a response that is characteristic of metal; these locations are also shown on the map.

The data shown on the RADAR SURVEY MAP (Drawing #291-90-01) are listed in tabular form in **Table I**, titled "GRID COORDINATES OF RADAR ANOMALIES".

## DESCRIPTION OF THE SURVEY

The survey covered an area of approximately 1 1/2 acres. A total of 50 radar survey lines were run on the site, covering the accessible portions of the site. The northwest corner and the southeast corner of the survey grid were not accessible for surveying with the GPR equipment.

The majority of the survey lines were run in the area north of the buildings as a series of parallel east-west lines with a spacing of 5 feet. In the northeast corner of the grid, seven survey lines were run with a 10-foot spacing. In the area west of the buildings, a series of fifteen north-south survey lines were also run with a spacing of 10 feet.

The "footprint" of each survey line covers a path nearly 5 feet wide at the surface of the ground, becoming progressively wider with greater depth. (The radar beam spreads about 20° on either side, or approximately 40° total beam angle measured from side-to-side.) In the area covered with the 5-foot spacing between adjacent lines, the survey provided 100-percent inspection of the total volume of soil. In the areas covered with the 10-foot spacing between adjacent lines, the survey effectively sampled 50 percent of the total volume of soil.

**Figure 1** illustrates a 600 MHz radar antenna being hand-pulled over the ground. For this site, the survey was run with a radar antenna operating at a frequency of 120 MHz. This larger, lower-frequency antenna can penetrate more deeply into the ground and is better suited for towing behind a vehicle. The radar system was set to probe to a depth of 24 feet. This 24-foot depth setting results in a vertical scale-factor of 1 inch = 2 feet on the 12-inch radar charts.

A van was used to tow the 120 MHz radar antenna along each survey line. The van carried all electronic controls, power supplies and recording equipment. All of the data were tape-recorded for subsequent laboratory analysis and interpretation. (These magnetic tapes are permanently retained in our project archives.) A scanning chart-recorder provided a hard-copy display of the radar data, as shown in **Figure 2**.

### Survey Grid

The survey grid is aligned with the buildings and structures on the site. The survey baseline designated as the Ø' EAST BASELINE is displaced two feet west of the west edge of the concrete ramp. The Ø' NORTH BASELINE is displaced 20 feet north of the building containing the Truck Service Bays. All north-south measurements were made with respect to the Ø' NORTH BASELINE. All east-west measurements were made with respect to the Ø' EAST BASELINE.

Two reference points, designated as GAI "A" and GAI "B", were also established on the grid. GAI "A" and GAI "B" are nails driven into the asphalt and marked with red surveyor's ribbon. Red fluorescent paint was sprayed on the asphalt to identify these grid reference points. GAI "A" is located 20 feet north of the building containing the Truck Service Bays, and 20 feet east of the Ø' EAST BASELINE. GAI "A" also defines the position of the Ø' NORTH BASELINE for the survey grid. The specific grid coordinates for GAI "A" are Ø'N, 20'E.

The marker nail designated as GAI "B" was driven into the asphalt at grid coordinates 100'N, 340'W. The placement of GAI "A" and GAI "B" provides a means of establishing the survey grid independent of the buildings and structures on the site.



Figure 1.

### 600 MHz RADAR ANTENNA

*The operator is guiding the high-resolution 600 MHz radar antenna along the surface of the ground. The handle has an event-marker switch to electronically annotate the ground locations on the radar charts. Extending to the left is the coaxial cable assembly (100 feet in length) which connects the radar antenna to the radar controls, power supplies, tape recorder and the graphics recording equipment.*

2 2 0335



Figure 2.

### CHART RECORDER AND RADAR CONTROLS

*The EPC scanning chart recorder (right foreground) produces the hard-copy vertical-profile radar records. All data is tape-recorded on the four-channel Hewlett-Packard instrumentation tape recorder (rear left). The radar control unit (left foreground) also provides the operator with a CRT display. The power supply (right background) provides a.c. electrical power for the system.*

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## DESCRIPTION OF THE SURVEY (Cont.)9

### Odometer Wheel

A 20-inch diameter "fifth-wheel" odometer attached to the rear bumper of the survey vehicle automatically logs distance traveled along the survey line. A microswitch attached to the frame of the odometer wheel triggers an electronically generated "tick-mark" at the top of the radar record. Each revolution of the odometer wheel is an incremental distance of 5 feet. Although the odometer wheel has been calibrated over long distances, its principal use is to record incremental distance traveled from the previous grid station, usually a marker stake or a spray-painted mark. It is assumed that the marker-stake locations are the most accurate (and most convenient) method of locating points along the survey line. To record the position of each marker stake, a manually operated event-marker switch generates a vertical dashed line on the radar record. Each increment of 100 feet is marked with a pair of these vertical dashed lines. Using the odometer wheel in conjunction with grid-marker stakes eliminates any problems with odometer wheel slippage or other possible sources of accumulated error over the length of the survey line. The use of two independent measuring systems also provides a back-up in the event of a malfunction of one of the systems.

### Accuracy of Ground Location

Although the odometer wheel is inherently accurate, the "tick-marks" at the top of the radar record only occur at intervals corresponding to a distance of 5.0 feet of travel (one revolution of the odometer wheel). To determine ground location between successive "tick-marks", it is necessary to interpolate. The accuracy of the interpolation process is about  $\pm 10$  percent, equivalent to about  $\pm 0.5$  feet for each 5-foot interval along the line of traverse. (The  $\pm 10$  percent criterion is derived from the possible short-term deviation in the velocity of the vehicle which tows the radar antenna. The tape recorder and the graphic chart recorder both run at constant speed. If the vehicle speeds up or slows down, it has the net effect of shrinking or stretching the horizontal scale, an effect which can be calibrated by observing the spacing between successive "tick-marks" on the radar record.)

Side-to-side location accuracy is normally about  $\pm 1$  foot, this being the accuracy of maintaining lateral position while running a survey line. Because the "footprint" of the antenna is a path nearly 5 feet wide, lateral deviations up to a foot or more have only a minor effect on the data. Although accuracy along the length of a line ( $\pm 0.5$  foot) is better than the lateral accuracy ( $\pm 1$  foot), ground location accuracy is generally specified as  $\pm 1$  foot in all directions.

## METHODOLOGY

The bulk of the survey was run as a series of parallel lines spaced 5 feet apart, which provided 100-percent coverage of the area contained with this spacing. Each survey line produced a vertical profile chart to a total depth of 24 feet. The data contained in each vertical profile chart was tabulated according to grid location and the results were plotted on a map. The map shows the distribution and relative concentrations of non-ionic and ionic material in the soil.

### Ionic Chemical Contamination

Ground-penetrating radar is capable of observing chemical contamination in the ground and is capable of distinguishing between ionic and non-ionic liquids.<sup>1</sup> Fundamentally, the presence of chemical contamination alters the physical properties of the host material. The two physical properties important to the radar are electrical conductivity and the dielectric constant. The presence of ionic chemicals (i.e., acids, bases, and salts) will typically increase the electrical conductivity of the ground. Such changes show as a lighter-than-normal contrast on the radar.

### Non-Ionic Chemical Contamination

Chemicals which are not electrically active (i.e., petroleum products, organics, pesticides and solvents) will typically modify the dielectric constant of the ground. This type of change is observed as a darker-than-normal contrast on the radar record.<sup>2</sup> Previous data had shown that our modified GPR equipment was capable of detecting concentration levels as low as a few parts-per-million (ppm). More recently, we have observed good, strong radar reflections from 2 ppm benzene in the soil, and believe that the detection threshold for our modified GPR system for detecting non-ionic liquids (pesticides, etc.) may currently be in the parts-per-billion (ppb) range.

<sup>1</sup> Stanfill, D.F. III and McMillan, K.S., "Inspection of Hazardous Waste Sites Using Ground-Penetrating Radar (GPR)," *Proc. National Conference on Hazardous Waste and Environmental Emergencies*, p. 244-249, Hazardous Materials Control Research Institute (H.M.C.R.I.), Cincinnati, OH, May, 1985.

<sup>2</sup> Stanfill, D.F. III and McMillan, K.S., "Radar-Mapping of Gasoline and Other Hydrocarbons in the Ground", *Proc. 6th National Conference on Management of Uncontrolled Hazardous Waste Sites*, p. 269-274, Hazardous Materials Control Research Institute (H.M.C.R.I.), Washington, D.C., November, 1985.

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## PRINCIPLES OF OPERATION

The ground-penetrating radar system is an echo-location system which emits a brief impulse of radio energy lasting only a few billionths of a second. The length of time for the radar echoes to return to the radar antenna corresponds to the depth below the surface. By recording these depth-dependent echoes on a scanning time-based chart recorder, a vertical profile of the ground is generated. This vertical profile shows the longitudinal distribution of subsurface strata and other features over which the radar antenna has passed.

### Velocity and Depth

The radar impulse travels into the ground at an average speed of about 40 percent of the speed of light. The exact speed depends on the nature of the material through which the impulse is traveling. The slowest medium is water, where the speed is about 11 percent of the speed of light. The fastest material is dry sand, where the speed is about 50 percent of the speed of light. In air, such as an underground cavity, the radar impulse travels almost exactly at the speed of light, taking one nanosecond (one billionth of a second) to travel one foot.

The ground-penetrating radar equipment is designed to measure and display the time-based echoes down to a fraction of a nanosecond. To convert to depth, it is necessary to know the exact velocity of the radar impulse as it travels through the ground. Over the past decade, Detection Sciences has developed a proprietary database of the radar velocities of various materials. With this database we are able to electronically calibrate the radar system within about 1 percent of local depth. Borings, test trenches and the common point method (a time-based geometric triangulation method) can also be used to depth-calibrate the radar. The ultimate limit of accuracy is determined by lateral variations in soil moisture content and the inhomogeneity of soil materials. Because of these limits, we have come to rely on electronic calibration. This method has proven to be at least as good as, or better than, the accuracy of depth measurements based on soil borings.

### Subsurface Reflections

At the interface of two materials, the radar impulse typically undergoes an abrupt change in velocity. It is this change in velocity which causes some of the radar energy to be reflected back to the surface of the ground where it is detected by the antenna. The amount of energy that is reflected, or the reflection coefficient, depends on the contrast between the two materials; i.e., the difference between their respective radar velocities. Because the radar velocity is proportional to the inverse square root of the dielectric constant, the fundamental parameter to which the radar is responding is the difference in the dielectric constants at the reflecting surface.

All materials with the exception of metals are relatively transparent to the passage of radar energy. Metals reflect all of the energy striking their surface; buried metal objects like pipes or metal containers are therefore excellent targets. The fact that most materials are relatively transparent means that the radar impulse can continue to send back reflection after reflection as it propagates downward into the ground, thus revealing the various subsurface strata and profiles.

### Subsurface Materials

In effect, the radar functions as a "difference meter" by drawing a boundary at the interface of two different materials. The "texture" of the radar reflections also vary with different type of materials. With experience it is possible to interpret the radar reflections to accurately identify common subsurface materials such as clay, peat, glacial till, and bedrock. Certain special situations, such as ionic chemicals, non-ionic chemicals, and gasoline in the soil which are also relatively easy to identify. Other situations such as interspersed layers of organic silt, silty sands, etc., are impossible to identify without direct visual inspection by means of a test trench or core sample.

## Use of Borings

The radar can be "calibrated" by using available boring logs to identify the types of subsurface materials. The best strategy is to first perform the radar survey and then use the radar data to specify the locations for a few strategically-placed borings. Although borings are useful for direct physical examination of subsurface materials and for confirming suspected low-density zones, the use of radar can largely supplant the use of borings. In this regard, it is useful to think of the radar system as a means of making a continuous profile of "electronic borings" spaced 1 to 3 inches apart. Each radar impulse and its successive train of echoes constitute a single scan, or sounding. At a rate of 52 vertical soundings per second, the radar is capable of generating millions of "electronic boreholes" in the course of a day. Using radar in conjunction with a few diagnostic borings is more economical than a complete schedule of borings. Radar also provides continuous subsurface profiles which is much more accurate than having to interpolate between borings.

## Penetration Depth

The penetration depth of the radar system depends on the operating frequency and the electrical conductivity of the ground. For shallow penetration of a few feet, the optimum choice is an operating frequency of 600 MHz. This small, lightweight antenna can penetrate to a depth of about 5 feet under the most adverse ground conditions, and as much as 25 to 30 feet under good conditions. "Adverse" refers to highly conductive materials having a resistivity of less than 10 ohm-meters. "Good" radar conditions are resistivities of several hundred ohm-meters or more.

Shifting to a lower operating frequency provides greater penetration, the improvement being the square root of the ratio of the respective wavelength. An operating frequency of 120 MHz is a good general-purpose frequency for reaching depths that are beyond the capability of the 600 MHz antenna. We routinely use this antenna to probe to a depth of 48 feet. The 48-foot depth setting provides a convenient vertical scale of 1 inch = 4 feet on the 12-inch vertical profile strip charts. In general, we tend to work in multiples of 12 feet so that the vertical scale factor on 12-inch charts will correspond to a convenient engineering scale (instead of using arbitrary time-based scales which have long been the custom in this field).

Although lower-frequency antennas provide greater depth of penetration, there is a corresponding loss of detail, or spatial resolution, due to the longer wavelength. The optimum is to use as high an operating frequency as possible consistent with the depth requirements, thus providing the best possible detail under the operating conditions. The useful range of ground-penetrating radar frequencies is limited to about 10 MHz at the lower end, up to a maximum of about 1200 MHz (1.2 GHz) at the upper end. The penetration of the 1.2 GHz antenna is limited to a few inches. The 10 MHz antenna can penetrate hundreds of feet into the ground but the corresponding loss of detail limits its usefulness to large features such as geologic strata. Fortunately, the most demanding spatial resolution requirements are usually small, near-surface targets such as wire reinforcing-mesh in concrete or the shallow burial of electric wires. The more deeply-buried targets are nearly always larger objects such as sewer pipes or storm drains.

The discussion regarding penetration depth assumes that all antennas have the same power. The penetration depth at any given frequency can be improved with increased power, but the improvement suffers from inverse-square losses as a function of depth, so that a quantum jump in power is necessary to gain any significant improvement. For this reason, Detection Sciences, Inc. has focused its research efforts on improving the sensitivity of the radar receiver and reducing the internal noise of the receiver. These efforts have paid off by increasing the penetration depth of our equipment by about a factor of 5 compared to standard, commercially-available systems. This improved capability allows Detection Sciences, Inc. to obtain data under conditions that were previously impossible for ground-penetrating radar. Unlike the early days of ground-penetrating radar, the depth of penetration, particularly in clay, is no longer a compelling issue.

## EQUIPMENT

The radar equipment consisted of a custom-modified GSSI SIR System-8 Subsurface Interface Radar. **Detection Sciences** has developed proprietary circuit designs and other proprietary modifications which have increased the depth of penetration by nearly a factor of five (5) compared to the original commercial equipment purchased in 1980. There are also corresponding improvements in spatial resolution and clarity of the radar records. The net result is that the modified radar system is able to penetrate clay and other difficult environments having high electrical conductivity (ionic materials) where it would be impossible to obtain data with an ordinary, unmodified radar system.

All data was tape-recorded on a Hewlett-Packard Model 3964A Instrumentation Tape Recorder. The radar graphic charts consist of vertical-profile strip charts run on an EPC Laboratories, Inc. Model 2200S Scanning Graphic Chart Recorder, as shown in Figure 2. The radar graphic charts are reproduced with a vertical scale of 2 feet per inch, equivalent to a total depth of 24 feet on a 12-inch high strip chart. The specific equipment used on this survey are:

**CONTROL UNIT.** The control unit is a custom-modified GSSI Model 4800. This unit contains the bulk of all the radar electronics and system controls, and has an oscilloscope which shows the amplitude of each radar impulse and its corresponding echoes.

**MOTOROLA MODEL M68MM01A/1A2 MONOBOARD MICROCOMPUTER.** The microcomputer has real-time processing capability for background removal, digital filtering, running averages, stacking and other radar signal-processing algorithms.

**HEWLETT-PACKARD MODEL 3964A TAPE RECORDER.** This high quality, four-channel instrumentation tape recorder provides master tapes of all data recorded in the field.

**EPC LABORATORIES, INC. MODEL 2200S CHART RECORDER.** This scanning chart recorder generates the 12-inch hard-copy radar graphic charts (vertical profiles) used to interpret the radar data.

**RADAR ANTENNA UNITS.** The custom-designed radar antennas have proprietary high-performance electronic circuits. The antennas operate at different frequencies; the depth requirements determine the operating frequency selected for the survey:

[ ] 900 MHz      [ ] 600 MHz      [ ] 300 MHz      [ X ] 120 MHz      [ ] 80 MHz      [ ] 10 MHz

**TRIPPE 500VA SOLID STATE INVERTER.** This power supply unit provides both 120 volt ac power as well as 12 volt dc power for operating all field equipment from the survey vehicle's electrical system.

**REMOTE STOP/START UNIT.** The remote stop/start feature allows the operator to control the radar system from the antenna location.

**ODOMETER WHEEL ASSEMBLY.** The custom-built, 20-inch diameter "fifth wheel" odometer attached to the rear bumper of the survey vehicle provides automatic logging of 5-foot increments traveled along the survey path. Each 5-foot increment is automatically recorded as a "tick mark" along the top of the radar chart.

**SUPPORT EQUIPMENT.** The various support equipment includes the Micro-computer Box, the Remote Control/Market Unit, Hand-held Marker Unit, towing sled, towing harness and miscellaneous electrical cables and connectors.

## RESULTS OF THE SURVEY

### Radar Survey Map

Drawing #291-90-01, titled "RADAR SURVEY MAP, CHEVRON ORLANDO SITE, ORLANDO, FLORIDA", shows the results of the survey. The soil conditions are identified as ionic or non-ionic. There are three gradations of relative concentrations, designated as "strong" "medium" or "light". (The specific concentration levels corresponding to the three gradation levels would have to be determined by laboratory analysis of soil samples.) The map also shows the location of each radar survey line run on the site.

### Ionic Anomalies

The areas showing an elevated electrical conductivity relative to the site at large are designated as having *ionic* anomalies. There are only two gradations of ionic anomalies: "medium" and "light". There were no locations where a strong ionic response (high electrical conductivity) was observed. The areas having moderately elevated levels of electrical conductivity, classified as *medium ionic* response, are shaded medium-grey. The areas having slightly elevated levels of electrical conductivity, classified as *light ionic* response, are shaded light-grey. The locations having elevated electrical conductivity appear to be confined to the northwest corner of the grid; elevated electrical conductivity was not observed at any other location.

### Non-Ionic Anomalies

The areas showing an elevated dielectric constant relative to the site at large are designated as having *non-ionic* anomalies. An elevated dielectric constant is indicative of a non-ionic liquid being present in the pore space of the soil. There are three gradations of non-ionic anomalies: "strong", "medium" and "light". The areas having the most elevated dielectric constant, classified as *strong non-ionic* response, are shown by the darkest cross-hatched shading. The areas having moderately elevated dielectric constant, classified as *medium non-ionic* response, are shown by the medium-toned cross-hatching. The areas having slightly elevated dielectric constant, classified as *light non-ionic* response, are shown by the lightest-toned cross-hatching.

## RESULTS OF THE SURVEY (Cont.)

<b>Metal</b>	In the area north of the Truck Service Bays in the vicinity of grid coordinate 100'E, the radar shows signatures that are characteristic of metal in the ground. These locations are shown on the map by the solid black shading.
<b>Concrete Covering</b>	The ground-penetrating radar system can penetrate through concrete and observe the soil conditions below the concrete. Penetrating through a concrete cover produces some attenuation of the radar signal. The net result is that light non-ionic condition may not offer much contrast compared to normal background conditions. About 2 feet east of the Ø EAST BASELINE, from grid coordinates 40'N to 90'N, there is a line of demarcation which corresponds to the edge of the concrete. We suspect that the light ionic conditions observed west of this line could possibly extend under the concrete, but the effects of the concrete may make these conditions too subtle to be observed. Alternately, the lack of observable anomalies under the concrete may be a genuine observation; the concrete could be acting as an umbrella, or shield, to protect the underlying soil from contamination. The line of demarcation at the edge of the concrete may therefore be an artifact caused by the run-off of surface water infiltrating into the adjoining soil. Soil testing would be necessary to resolve this question.
<b>Vertical Distribution</b>	The map shows the lateral distribution of modified soil characteristics. The vertical distributions observed on this site are relatively featureless. To define the meaning of "featureless" vertical distribution, it is necessary to describe more ordinary vertical distributions observed with GPR.  In the absence of lateral migration patterns (which is the case on this site), we are often able to see distinct phase-fronts of vertical migration. We believe that these phase-fronts are the result of viscosity segregation, where migration rates are determined by the viscosity of the various components of liquid contaminants (including dissolved contaminants). The soils appear to act like a chromatography column, separating the various components into discrete phase-fronts according to their specific rates of migration. We do not observe any such phase-fronts of vertical migration on this site. We suspect that the sandy soils are relatively permeable, permitting vertical migration down to the shallow water table without noticeable vertical segregation effects.

## RESULTS OF THE SURVEY (Cont.)

### Lateral Boundaries

The areas with non-ionic response have sharply-defined lateral boundaries. In particular, the areas with the strongest levels of non-ionic response have sharp, vertical boundaries that indicate that the non-ionic material is contained within the boundaries of an excavation. We observe the interruption of the soil horizons in the surrounding soils, which provides additional evidence of an excavation having been made at these locations. The strong radar responses observed at these locations are indicative of relatively high concentration levels (hundreds, or thousands of ppm), possibly approaching saturation conditions.

### "Sinkers"

We do not observe any vertical "sinkers" on this site. Sinkers consist of liquid components whose density is greater than water. Sinkers can be observed migrating down through the soil, extending below the shallow water table. Such behavior is typical of liquids such as creosote and heavy petroleum distillates. The radar data indicates that the liquid components on this site appear to be contained within the pore spaces of the soil above the shallow water table. The absence of sinkers suggests that the liquid components are less dense than water.

### Table I

For convenience, all of the data shown on the RADAR SURVEY MAP have been numerically tabulated in **Table I**, titled "GRID COORDINATES OF RADAR ANOMALIES". This table lists the grid coordinates on each radar survey line where the radar anomalies are observed. In all cases, the conditions described in the Table extend down a depth corresponding to the shallow water table.<sup>3</sup>

<sup>3</sup> Due to capillary action, water tables are seldom visible with GPR. In certain rare situations where coarse sand or well-washed gravel cannot support a capillary fringe, there may be a sharply-defined water table that is visible on radar. Otherwise, most soils have a capillary fringe about two feet thick. Within the fringe, there is a gradual transition of moisture level, ranging from the residual soil moisture level above the fringe to full saturation below the fringe. The gradual transition of moisture level in the capillary fringe does not provide a distinct water surface that is capable of producing a radar reflection.

Table I.

**GRID COORDINATES OF RADAR ANOMALIES**  
**CHEVRON SITE, ORLANDO, FLORIDA**

Survey Line	Start of Condition	End of Condition	Type of Condition
0' N	85' E	95' E	Metal
	104' E	121' E	"
	11' W	63' W	Medium Non-Ionic *
5' N	12' E	40' E	Light Non-Ionic
	43' W	64' W	"
	86' E	120' E	Metal
	8' W	43' E	Medium Non-Ionic
10' N	148' E	163' E	Light Non-Ionic
	28' W	60' W	"
	109' W	126' W	"
	52' E	67' E	Metal
	86' E	122' E	"
	137' E	148' E	"
	60' W	85' W	Medium Non-Ionic
15' N	154' E	167' E	Light Non-Ionic
	45' W	84' W	"
	10' E	27' E	"
	66' E	85' E	"
	87' E	95' E	Metal
	109' E	119' E	"
	133' E	142' E	"
	43' E	66' E	Medium Non-Ionic
20' N	39' E	55' E	Light Non-Ionic
	69' E	88' E	"
	156' E	176' E	"
	26' W	49' W	"
	88' W	99' W	"
	88' E	122' E	Metal
	55' E	69' E	Medium Non-Ionic
	136' E	143' E	"
	49' W	70' W	"
25' N	32' E	50' E	Light Non-Ionic
	81' E	98' E	"
	31' W	70' W	"
	85' W	114' W	"
	132' W	152' W	"
	50' E	81' E	Medium Non-Ionic
	122' E	149' E	"
30' N	52' E	89' E	Strong Non-Ionic
	124' E	149' E	"
	89' E	124' E	Light Non-Ionic
	149' E	171' E	"
	30' W	50' W	Light Non-Ionic
	31' E	52' E	Medium Non-Ionic
	50' W	72' W	"
35' N	64' E	91' E	Strong Non-Ionic

Table I. (Cont.)

**GRID COORDINATES OF RADAR ANOMALIES  
CHEVRON SITE, ORLANDO, FLORIDA**

Survey Line	Start of Condition	End of Condition	Type of Condition
35' N	111' E	145' E	Strong Non-Ionic
"	91' E	111' E	Light Non-Ionic
"	58' W	76' W	"
"	32' E	64' E	Medium Non-Ionic
"	145' E	177' E	"
40' N	60' E	110' E	Strong Non-Ionic
"	121' E	153' E	"
"	5' E	17' E	Light Non-Ionic
"	110' E	121' E	"
"	153' E	175' E	"
"	55' W	74' W	"
"	28' E	60' E	Medium Non-Ionic
45' N	179' E	192' E	Light Non-Ionic
"	42' E	151' E	Strong Non-Ionic
"	55' W	74' W	Light Non-Ionic
"	4' E	16' E	Medium Non-Ionic
"	25' E	42' E	"
50' N	42' E	145' E	Strong Non-Ionic
"	14' E	42' E	Light Non-Ionic
"	166' E	186' E	"
"	41' W	70' W	"
"	5' W	14' E	Medium Non-Ionic
55' N	53' E	79' E	Strong Non-Ionic
"	96' E	125' E	"
"	4' E	23' E	Light Non-Ionic
"	153' E	166' E	"
"	53' W	72' W	"
"	79' E	96' E	Medium Non-Ionic
"	125' E	142' E	"
"	166' E	187' E	"
60' N	86' E	136' E	Strong Non-Ionic
"	4' E	15' E	Light Non-Ionic
"	45' E	86' E	"
"	184' E	195' E	"
"	166' E	184' E	Medium Non-Ionic
"	53' W	70' W	"
63' N	243' E	260' E	Light Ionic
65' N	86' E	117' E	Strong Non-Ionic
"	3' E	15' E	Light Non-Ionic
"	52' E	86' E	"
"	166' E	185' E	"
"	50' W	80' W	"
"	117' E	130' E	Medium Non-Ionic
70' N	89' E	138' E	Strong Non-Ionic
"	5' E	40' E	Light Non-Ionic
"	73' E	89' E	"

**Table I. (Cont.)**

**GRID COORDINATES OF RADAR ANOMALIES  
CHEVRON SITE, ORLANDO, FLORIDA**

<b>Survey Line</b>	<b>Start of Condition</b>	<b>End of Condition</b>	<b>Type of Condition</b>
70' N	58' W	68' W	Light Non-Ionic
"	238' E	267' E	Medium Ionic
75' N	49' E	73' E	Medium Non-Ionic
"	130' E	150' E	Light Non-Ionic
"	62' E	92' E	Strong Non-Ionic
"	3' E	22' E	Light Non-Ionic
"	44' E	62' E	"
"	50' W	72' W	"
"	92' E	108' E	Medium Non-Ionic
80' N	70' E	103' E	Strong Non-Ionic
"	3' E	33' E	Light Non-Ionic
"	131' E	147' E	"
"	26' W	56' W	Light Non-Ionic
"	56' W	70' W	Medium Non-Ionic
85' N	52' E	78' E	Light Non-Ionic
"	0' E	38' E	"
"	26' W	45' W	"
"	45' W	74' W	Medium Non-Ionic
90' N	7' W	12' E	Light Non-Ionic
"	19' E	39' E	"
"	203' E	243' E	Medium Ionic
"	7' W	70' W	Medium Non-Ionic
95' N	25' E	36' E	Light Non-Ionic
"	43' W	63' W	"
"	5' E	43' W	Medium Non-Ionic
"	63' W	77' W	"
100' N	216' E	230' E	Light Ionic
"	47' E	75' E	Light Non-Ionic
"	3' E	70' W	"
"	230' E	255' E	Medium Ionic
110' N	217' E	2P33' E	Light Ionic
"	233' E	272' E	Medium Ionic
120' N	231' E	250' E	Light Ionic
5' S	26' W	64' W	Medium Non-Ionic
"	85' E	96' E	Metal
10' S	24' W	70' W	Medium Non-Ionic
50' S	20' W	57' W	Light Non-Ionic
"	127' W	148' W	"
30' W	0' N	13' S	Medium Non-Ionic
"	48' S	62' S	Light Non-Ionic
40' W	0' N	21' S	Medium Non-Ionic
"	36' S	52' S	Light Non-Ionic
50' W	0' N	31' S	Medium Non-Ionic
"	46' S	63' S	Light Non-Ionic
60' W	0' N	25' S	Medium Non-Ionic
"	75' S	90' S	"

Table I. (Cont.)

**GRID COORDINATES OF RADAR ANOMALIES  
CHEVRON SITE, ORLANDO, FLORIDA**

Survey Line	Start of Condition	End of Condition	Type of Condition
60' W	25' S	75' S	Light Non-Ionic
70' W	61' S	85' S	"
"	102' S	112' S	"
80' W	47' S	74' S	Medium Non-Ionic
"	99' S	125' S	Light Non-Ionic
90' W	61' S	74' S	Medium Non-Ionic
"	74' S	114' S	Light Non-Ionic
"	19' N	36' N	"
"	53' N	77' N	"
100' W	78' S	125' S	"
110' W	75' S	125' S	"
120' W	65' S	83' S	Medium Non-Ionic
"	105' S	127' S	Light Non-Ionic
130' W	68' S	80' S	Medium Non-Ionic
"	80' S	106' S	Light Non-Ionic
140' W	40' S	55' S	"
"	70' S	89' S	Medium Non-Ionic
150' W	50' S	65' S	"
"	65' S	90' S	Light Non-Ionic
160' W	54' S	95' S	"
170' W	52' S	88' S	"
180' W	71' S	78' S	"

\* All conditions are observed in the pore spaces of the soil. The depths extend from the near-surface soils down to the water table.

## CONCLUSIONS

### Ionic Materials

The relatively low levels of ionic response observed with the radar system appear to be confined to the northwest corner of the survey grid. It is possible that these relatively low levels of ionic response could be due to natural soil conditions. Soil samples would be required to resolve this question.

High levels of ionic response — indicating high levels of concentration — are noticeably absent on this site. It appears that the material handling activities on this site were principally concerned with non-ionic materials, such as organic liquids and petroleum derivatives.

### Non-Ionic Materials

Non-ionic responses were the prevailing characteristic of this site. In particular, the sharply-delineated edges of the conditions identified as strong non-ionic response indicate that these materials had been placed in some type of excavation. Surface spillage could not account for the type of radar signature observed in the areas where strong non-ionic response is found.

### Boring Locations

Based on the soil characteristics observed with the ground-penetrating radar system, we had previously recommended certain strategically-placed boring locations for obtaining soil samples. The recommended locations, together with other locations planned to be investigated by Brown & Caldwell, are listed in Table A-1 in the APPENDIX.

The soil sample data, in conjunction with the ground-penetrating radar data, should provide an assessment of site conditions that is far more comprehensive than could be obtained with either method alone.

## RETROSPECTIVE

Although ground-penetrating radar is a powerful tool, it is an indirect method for assessing the actual soil conditions. The radar is exceedingly sensitive to localized changes in the physical properties of the soil, including the changes brought about by the presence of chemical contamination in the soil. But changes in the physical properties of the soil, including localized changes, can also be brought about by natural physical processes irrespective of any industrial use of the site.

What we attribute as being ionic and non-ionic "contamination" is largely circumstantial, bolstered by the fact that we know the site was used for handling potentially hazardous materials. Previous soil borings have also shown contamination to be present in the soil. The strongest circumstantial evidence is the placement and lateral distribution of the altered physical properties as seen by the radar. The resulting distribution pattern of non-ionic radar signatures, when plotted on the site maps, is entirely consistent with what we know about the former usage of the site.

The program of borings and soil sampling can be expected to provide definitive answers as to what the radar is actually seeing at various locations on the site. Experience has shown that a single-point calibration (soil sample) can be extended over the lateral extent of the radar signature; i.e., the radar can be relied upon, with a high level of confidence, to show the lateral extent of any particular condition that has been quantitatively identified by external means.

We recommend correlating the available laboratory analysis of soil samples with the radar data to "calibrate" or quantize the radar response in regard to observed contamination levels. Although the radar response is a composite of *all* of the contaminants in the ground at any single location, the radar map should still indicate the lateral extent of the "soup" found at any location. Moreover, the radar information is valuable for what it does *not* indicate: i.e., the *absence* of any anomalous radar response which would indicate the presence of contamination in the ground.

At this point, we believe the threshold sensitivity of our high-performance radar to be in the ppb range. This estimate is an extrapolation of quantitative data (obtained at another site) where we have observed a strong radar response at levels of 2 ppm of benzene. What we conclude is that contamination levels in the areas of this site where no radar response was observed would have to be well below the ppm range — or else the radar would have observed some level of response.

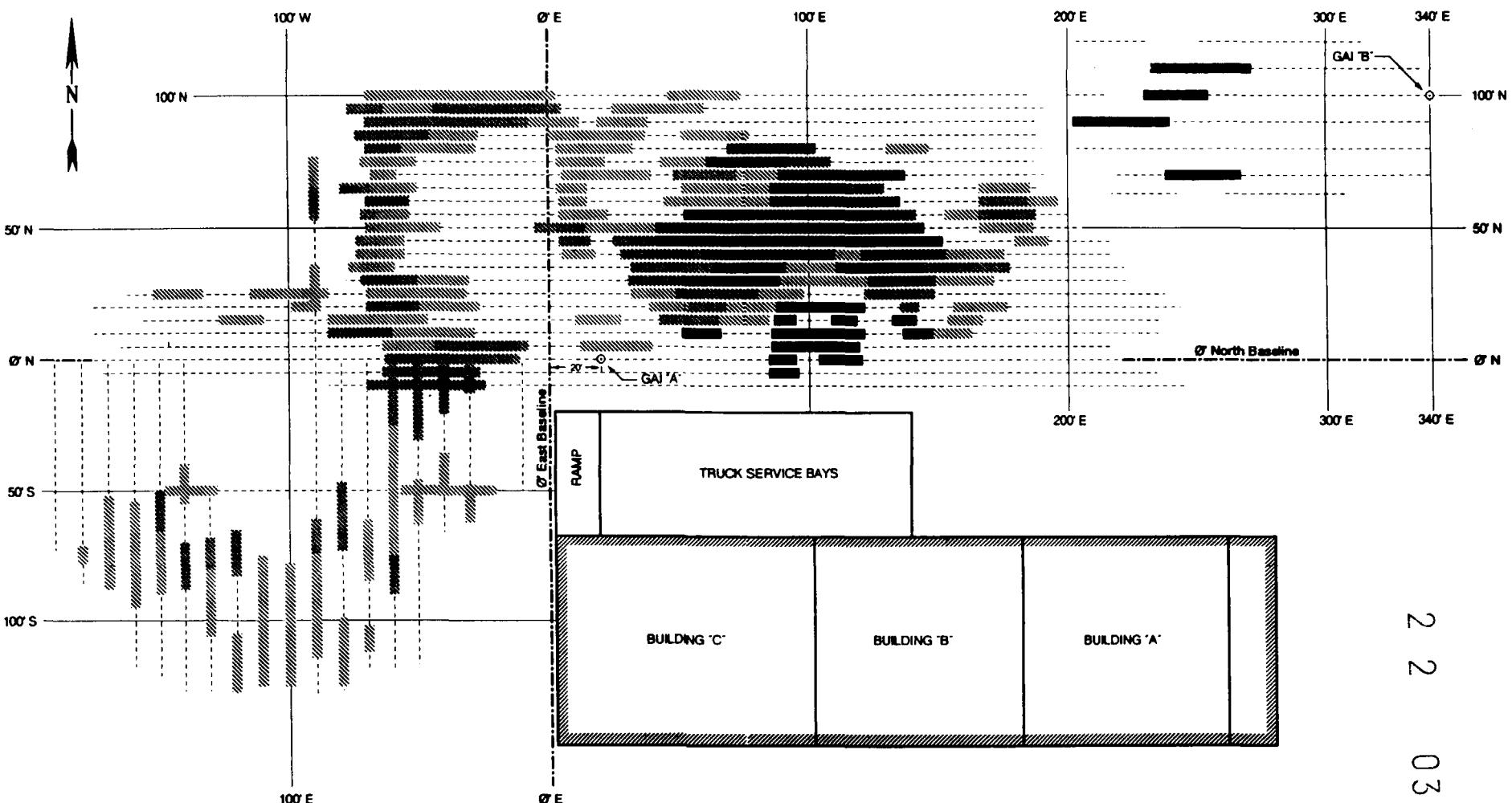
**APPENDIX**

**Table A-1**
**RECOMMENDED BORING LOCATIONS  
CHEVRON SITE, ORLANDO, FLORIDA**

Boring Number	Grid Location	Comments
1	Outside of radar coverage	-
2	"	-
3	"	-
4	"	-
5	"	-
6	"	-
7	"	-
8	"	-
9-1	"	-
9-2	"	-
9-3	"	-
9-4	"	-
10-1	"	-
10-2	"	-
10-3	"	-
10-4	"	-
11-1	103°S, 109°W	No change
11-2	80°S, 137°W	No change
11-3	Outside of radar coverage	-
11-4	80°S, 80°W	No change
12-1	Outside of radar coverage	-
12-2	"	-
12-3	"	-
12-4	"	-
13-1	"	-
13-2	"	-
13-3	"	-
13-4	"	-
14-1	25°S, 148°W	Move to 35°S, 150°W
14-2	Outside of radar coverage	-
14-3	"	-
14-4	10°S, 100°W	No change
15-1	Outside of radar coverage	-
15-2	"	-
15-3	"	-
15-4	"	-

**Table A-I (Cont.)****RECOMMENDED BORING LOCATIONS  
CHEVRON SITE, ORLANDO, FLORIDA**

Boring Number	Grid Location	Comments
16-1	Outside of radar coverage	-
16-2	"	-
16-3	"	-
16-4	"	-
17	10°N, 65°W	No change
18	50°N, 65°W	No change
19	72°N, 52°W	No change
20	56°N, 5°W	No change
21	28°N, 6°E	No change
22	37°N, 16°W	No change
23	2°S, 16°W	Move to 0°N, 17°W
24-1	Outside of radar coverage	-
24-2	"	-
24-3	"	-
24-4	"	-
25-1	98°N, 84°E	Move to 100°N, 52°E
25-2	Outside of radar coverage	-
25-3	"	-
25-4	98°N, 84°E	No change
26-1	15°N, 39°E	Move to 15°N, 50°E
26-2	52°N, 39°E	No change
26-3	53°N, 84°E	No change
26-4	17°N, 84°E	No change
27	62°N, 107°E	No change
28-1	Outside of radar coverage	-
28-2	"	-
28-3	84°N, 82°E	No change
28-4	46°N, 63°E	No change
29-1	74°N, 223°E	Move to 90°N, 230°E
29-2	110°N, 225°E	Move to 110°N, 240°E
30	Outside of radar coverage	-
31-1	92°N, 295°E	Move to 90°N, 304°E
31-2	125°N, 309°E	Move to 120°N, 290°E



#### Legend

- Radar Survey Line
- █████ Metal
- █████ Medium Ionic
- █████ Light Ionic
- █████ Strong Non - Ionic
- ███████ Medium Non - Ionic
- ███████ Light Non - Ionic

Scale:  
0 15 30 60 90

— RADAR SURVEY MAP —  
CHEVRON ORLANDO SITE  
ORLANDO, FLORIDA

DETECTION SCIENCES, INC.  
496 Heald Road, Carlisle, MA 01741

Date: September 7, 1990	Drawing No.: 291-90-01
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